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THE DIFFERENTIAL DIAGNOSIS OF DISEASED CONDITIONS AND ABNORMALITIES OF THE MOUTH AND FEET OF CATTLE, SHEEP AND SWINE, WITH PARTICULAR REFERENCE TO FOOT-AND-MOUTH DISEASE*

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When I was invited by our Secretary, Mr. Ironside, a few weeks ago, to read a paper on this subject, I can assure you that I was extremely diffident in doing so, for the following reasons; firstly, the subject is such an important one that it is almost impossible to deal with it adequately in a paper of this description, and secondly, I have never before appeared in the rôle of essayist at a Divisional meeting of the N.V.M.A. However, differential diagnosis of this nature is of great interest to me, and if I succeed in stimulating a good discussion I shall be more than satisfied.

In presenting this paper I propose to confine myself almost exclusively to conditions I have personally met with in this country since graduation eleven years ago. Three of these years have been spent in the service of the Veterinary Department of the Ministry of Agriculture and Fisheries, during the prevalence of foot-and-mouth disease, and the remainder of the time in private practice in one of the best known grazing districts of England. For convenience, the diagnosis of foot-and-mouth disease will be dealt with first, and subsequently other diseases and abnormalities will be discussed, with a view to making a differential diagnosis.

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Prior to dealing with the classical symptoms of foot-and-mouth disease in cattle, it may perhaps be advantageous to make a few preliminary remarks with regard to the care that should be exercised by the veterinarian both as regards the method of examination, and also as to his personal disinfection. These remarks apply equally to the whole-time official and to the private practitioner, and neglect of these precautions may lead to disastrous results.

In a typical case, little or no difficulty is experienced in arriving at an accurate diagnosis, but if the veterinary surgeon is called in early, usually only one animal is suspected, and even in this, definite lesions may not, as yet, have developed. It is necessary, therefore, to proceed with extreme caution, and to resort to a thorough examination prior to giving a definite opinion. A considerable number of cases are met with in which the suspect has to be kept under observation from 24 to 36 hours, or occasionally even longer, before one can be certain. In all these cases the safest plan is to regard them as potential outbreaks of foot-and-mouth disease until subsequent developments prove them otherwise. The Ministry of Agriculture's recommendations as to personal disinfection, the wearing of rubber overall clothing, isolation of suspects wherever possible, and provision of a separate attendant should be rigidly adhered to. Such care may, perhaps, seem unnecessary to the average layman, but of its importance there is no doubt, and one cannot over-emphasise the point that it is always advisable to err on the side of safety. Space will not permit of further preamble, and it will be necessary to give but the briefest account of many conditions, in order to confine the paper within reasonable limits. Many of the conditions to which a passing reference is made are not likely to be mistaken for foot-and-mouth disease by an experienced practitioner, but are frequently met with as suspected cases during a "foot-and-mouth scare."

Foot-and-Mouth Disease

Definition.—Foot-and-mouth disease is an acute febrile, contagious, infectious disease of cloven-footed animals, in the course of which a vesicular exanthema develops on the mucous membranes and the skin, especially in the mouth and the interdigital spaces. The causative factor is an ultra-microscopical organism (Hutyra and Marek, Vol. 1, 3rd edition, page 403).

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Symptoms.—If the case is seen in its earliest stages, in all probability lesions of a definitely diagnostic nature will not as yet have developed, and the suspect may just be showing signs of a pyrexia with accompanying systemic disturbance. Rumination is usually suspended, and the appetite capricious. In milch cows the milk yield is appreciably lowered. The temperature usually varies between 104° F. and 106° F., but readings as high as 108° F. have been recorded; this is, however, exceptional in an uncomplicated case. Within a few hours vesicles make their appearance, sometimes developing first in the mouth, and at other times in the feet. When mouth lesions appear first, owing to the great

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tenderness of the buccal mucosa the animal may now refuse all food. If any is eaten it is masticated with great care, to avoid injuring the inflamed surface, and a considerable amount may be "quidded." The mouth is kept closed, and is opened spasmodically at frequent intervals, making a characteristic smacking sound, and saliva of a ropy nature dribbles from the corners of the mouth. Handling is resented at this stage on account of the pain is causes. If the mouth is examined, vesicles will be seen forming in some or all of the following positions, *viz.*, upper surface of the free portion of the tongue, inside the upper and lower lips and on the gums and the dental pad. The vesicles vary in size from that of a pea to that of a small hen's egg, and occasionally much larger ones are encountered, particularly on the tongue, owing to the coalescence of several smaller ones. When fully formed, the vesicles are easily ruptured, and a clear, watery fluid escapes. The exposed surface has a red, inflamed appearance, and is surrounded by ragged edges. With the rupture of the vesicles the temperature drops, frequently to normal, and a general improvement is noted. Healing of the vesicles takes place rapidly, provided there is no secondary infection. It is well advanced in 36 hours and no cicatrix is left in an uncomplicated case. Vesicles are occasionally seen on the muzzle, and less frequently on the Schneiderian mucous membrane.

Foot lesions consist of a vesication essentially similar in character to that shown in the mouth, and cause lameness, which is often acute. Another common symptom is shaking of the hind feet as if to dislodge some foreign body from between the claws. The vesicles are particularly prominent at the bulb of the heel, where they are easily ruptured with the finger and thumb; they extend forward along the interdigital space and occasionally also round the coronary band. Healing is relatively slower than that of the mouth lesions, owing to the exposed position and the greater liability to secondary infection.

Mammary lesions are frequently seen in outbreaks in housed milch cows, but are by no means constant. When present they involve both the udder and teats. The latter are often swollen and extremely painful, and the milk yield greatly lessened or entirely suspended. The vesicles are of a similar nature to those in other positions. One beast in a herd at grass may show symptoms of foot-and-mouth disease two, or even three days in advance of its fellows, but when the cattle are housed the second case usually follows the first much more quickly.

Healing of Lesions.—In contra-distinction to various other forms of stomatitis, the healing of mouth lesions in foot-and-mouth disease is extremely rapid, since it takes place from both the centre and edges of the lesion. The ragged epithelium caused by the rupture of vesicles sloughs off in a few hours. Within about 24 hours the colour of the denuded surface has changed from a bright red to a brownish hue, and in another 48 to 72 hours' time it has assumed a uniform covering of the new epithelium, which is greyish in colour. Providing no secondary crop of vesicles forms, it is generally impossible a few days later to detect anything at all abnormal with the mouth. The writer has, on more than one occasion, examined the mouths of cattle in isolation cases at about ten days after confirmation of disease, and in most instances recovery was then complete.

Foot Lesions.—The healing of foot lesions is a very much slower process, and if vesicles have developed all round the coronet, separation frequently occurs, leaving a space between the old detached horn and the new horn growing down from the coronary band. This space persists for several weeks until it finally disappears on the completed growth of a new hoof. During the healing process there is great danger of infection by soil and other foreign materials, which cause intense lameness. The writer has recollections of concealed old-standing outbreaks in 1923-25, in which the sole remaining definite lesions were those affecting the feet, and in which diagnosis and approximate duration of disease was established by the growth of new horn and the degree of separation.

Mammary lesions heal fairly rapidly if not interfered with to any great extent, but in many instances, particularly in heavy milkers, abscess formation, or a parenchymatous mastitis may follow, affecting one or more quarters. Mastitis as a sequel was frequently noted in isolation cases.

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Before passing on to a description of lesions in the sheep and pig, it may perhaps be advisable to mention that very young animals may die from foot-and-mouth disease without exhibiting any of the classical symptoms. Death in these instances is due to acute toxæmia, and the only lesion found on *post-mortem* examination may be a slight gastro-enteritis.

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Sheep.—Lesions in these animals are very similar to those in cattle, except that usually the mouth lesions are not so numerous, and almost entirely confined to the dental pad. Generally speaking, the systemic disturbance is much more severe in sheep than in cattle. The affected animals are often extremely lame, or even prostrate, and can then be caught very easily. Shedding of the hooves is a fairly frequent occurrence with the acute type of disease, and the resultant exposure of the sensitive structures not only increases the lameness, but may be followed by pneumonia, and even death, due to the animals lying about. On several occasions the writer has seen foot-and-mouth disease in sheep

co-existent with foot rot, and a positive diagnosis of the former can only be made when corroborative vesication is to be found in the mouth on the dental pad. In these instances if pressure is applied to the dental pad with the fingers, the membrane readily sloughs off, leaving the usual red, angry-looking base.

Swine.—It is the confirmed opinion of the writer, based on actual experience, that the spread of foot-and-mouth disease during recent years in this country was due, in many districts, largely, if not solely, to preliminary undiscovered outbreaks amongst pigs. Many cases were wilfully concealed, but in others, ignorance of the actual symptoms was responsible. Where no other stock was kept (*i.e.*, cattle or sheep) on the same premises, the pigs remained an active centre of infection for several weeks whilst they made a slow recovery. Mouth lesions are by no means constant in swine, but vesicles are occasionally met with on the gums and tongue, and more frequently on the snout. The mammary gland is a fairly common seat in sows. The predilection seat, however, is the feet and supernumerary digits, where well-marked vesication occurs, causing extreme lameness, which is particularly distressing in fat, heavy sows. In acute cases the hooves are often shed, and this is a valuable aid to diagnosis. If the old horn of the hoof is not shed in the preliminary stages, separation occurs at the coronet. As the new horn grows it is gradually pushed downwards (*i.e.*, the old hoof) until after several weeks it is replaced by a new hoof. The old horn on top of the new hoof has been likened to a thimble on a human finger, and this is indeed an excellent comparison. The writer has in mind one very excellent case of "thimbling" in a pedigree herd which had been in existence for at least eight weeks when discovered, and had been the origin of a large number of outbreaks among cattle in the surrounding district.

I have several times visited reported cases among cattle on farms, and found that they had not, as yet, developed definitely diagnostic lesions, but on examining the pigs which the owner had merely thought had been "off their feet," confirmation was made easy by the exhibition of typical lesions.

Differential Diagnosis

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A: MOUTH LESIONS.

Mouth Lesions.—There are several varieties of stomatitis, and other conditions of the mouth, besides a considerable number of foot lesions which may give rise to suspicions of foot-and-mouth disease. The following description covers the more important, together with several other conditions, which are not likely to cause the veterinary surgeon much trouble in diagnosis, but which, nevertheless, are frequently reported by owners when there is an outbreak in the vicinity.

Vesicular Stomatitis.—Since foot-and-mouth disease itself is essentially a vesication, it is fairly obvious that any other disease producing similar lesions in the mouth must be examined with extreme care before a negative diagnosis can be given regarding it. In this disease, vesicles appear almost entirely on the tongue, but occasionally they are found on the gums. The lesions vary in size up to that of a florin, and, as a general rule, a single vesicle is found near the tip of the tongue, although at times two or three, or even more, may be found further back on the dorsum. A copious salivation is produced, and a smacking sound, exactly like that in foot-and-mouth disease, is noted. This is caused by the similar character and position of the vesicles. The only differential characteristics are absence of foot lesions, and the fact that the disease is not readily contagious. Generally speaking, only one beast is affected, but this is not always the case, and several beasts in a lot have frequently been noted showing symptoms. The systemic disturbance is not usually as great as in foot-and-mouth disease, and the temperature is not generally raised more than one or two degrees. It has been stated that the epithelium covering the vesicle is much tougher than that of foot-and-mouth disease, and that the centre shows a small aperture, but in my limited experience the lesions have been clinically indistinguishable prior to rupture. After rupture the lesion has clear-cut edges and appears deeper than in foot-and-mouth disease, and the papillæ are destroyed; consequently, healing takes considerably longer. All cases showing lesions of vesicular stomatitis must be treated with caution, and a definite diagnosis should not be given with undue haste, and until a thorough examination has been made. Generally speaking, it is necessary to keep the case under observation from 24 to 48 hours before foot-and-mouth disease can be eliminated by the non-development of foot lesions, and absence of spread to contact animals. In exceptional cases the housing of a control animal with the suspect should help one to arrive at a definite diagnosis in three to four days.

Malignant Catarrh.
(*Synonyms, Gangrenous Coryza, Malignant Catarrhal Fever.*)

Definition.—Malignant catarrh is a contagious affection of cattle characterised by acute catarrhal inflammation of the mucous membranes of the respiratory and alimentary tracts, and sometimes the skin ("Encyclopædia of Veterinary Medicine," edited by G. H. Wooldridge, Vol. 1, p. 102). This disease is of common occurrence in this country, and in the Midlands is chiefly noted in the spring among recently-purchased cattle, both Irish and home-bred. Cases are less frequently noted in the autumn

and winter. The experience of the writer, which is based on a large number of cases, is definitely opposed to the view that this disease is contagious, and although several recently-purchased animals may show symptoms at the same time, in no instance has he known disease to spread to other cattle on the same premises. The literature on this disease is scanty, and it appears to differ somewhat from the disease met with in the north of Scotland (Hepburn, *Veterinary Record*, March 14th, 1925) and described as "transit fever."

Symptoms may be noted in one or more animals of a lot at the same time. They are ushered in by febrile disturbance, with a rapid rise in temperature, frequently reaching 107° F. to 108° F. For 24 to 48 hours no further developments may take place beyond a generalised debility due to hyper-pyrexia, and the case may be diagnosed as a common cold or chill (simple catarrhal fever). By the end of the second day, however, a conjunctivitis is usually noted, with accompanying lachrymation. At about the same time a nasal discharge, of a thick yellowish catarrhal nature, appears; this later takes on a muco-purulent character, and becomes extremely foul-smelling. The mouth, if examined, at this stage, is hot and dry and congested. It assumes a fairly general bright red colour, and this is particularly noticeable on the upper surface of the tongue. The hard palate has a similar though somewhat spotted blotchy appearance. The writer has also frequently noted at the same time a similar condition, accompanied by petechiæ of the fauces, and which can be easily seen if the tongue is pulled well forward. Rumination is generally in abeyance, and the animal eats little or nothing owing to the progressive systemic effects and the inflamed condition of the buccal mucosa. Any food that is taken is eaten extremely slowly and carefully, and deglutition appears to be difficult. Within a few hours yellowish membranous catarrhal deposits are formed, particularly on the dental pad and gums, and near the tip of the tongue. Their formation is accompanied by salivation, which is often profuse, and if the lesions have formed on the tip of the tongue, a smacking sound, indistinguishable from that heard in foot-and-mouth disease, may be noted. On examination of the mouth the deposits are readily detached with the fingers, leaving a superficial red granulating sore. The nasal mucosa undergoes similar developments, and owing to its swollen nature it frequently interferes with breathing, and snuffling is often heard. The disease may extend into the frontal sinus, and even into the horn cores. The horn cores may loosen and eventually drop off, but although the writer has seen a large number of these cases, he has only personally met with this complication twice, and then it was accompanied by photophobia and subsequent blindness, and death. The malaise is very severe, and the breath particularly offensive, and rapid emaciation occurs owing to the progressive toxæmia. After a preliminary period of constipation, diarrhœa usually sets in owing to the extension of the infection causing a catarrhal condition of the stomachs and intestines. The breathing becomes accelerated and a bronchopneumonia affecting both lungs is a common sequel, often causing a fatal termination of the illness. Skin lesions may be noted, particularly affecting the base of the false digits, and the interdigital spaces, and also in the form of a dermatitis around the coronets. The resultant lameness complicates the difficulty of differential diagnosis, although, of course, no lesions in the nature of a true vesication can be detected.

From the foregoing description it would appear that there is little similarity between this condition and foot-and-mouth disease, and that they could be distinguished from each other comparatively easily. In actual practice, however, in which several recently-purchased animals are all showing symptoms, with accompanying salivation, and perhaps lameness, it is an extremely difficult matter. A definite opinion should not be given hurriedly and without a thorough examination. Generally speaking, if the case is kept under observation from 24 to 48 hours all doubts are removed by further developments. It has been the writer's experience that the vast majority of suspected cases of foot-and-mouth disease, which are indefinite when first examined, and have to be kept under observation for any length of time, usually turn out to be negative.

To summarise, the following are the main differential features between malignant catarrh and foot-and-mouth disease:—

(1) Far greater systemic disturbance in malignant catarrh than in foot-and-mouth disease, the attack often ending fatally.

(2) Temperature is usually considerably higher in malignant catarrh. In one case seen by the writer this spring, five out of seven recently-purchased cattle showed lesions, and their temperatures ranged from 105·6°-107·8°F.

(3) Foul-smelling condition of buccal and Schneiderian mucosa in malignant catarrh, whereas in foot-and-mouth disease the lesions have no smell.

(4) Lesions of malignant catarrh take considerably longer to develop than those of foot-and-mouth disease, and may take as long as 14 days. In that time a case of foot-and-mouth disease would have recovered.

Catarrhal Stomatitis.—In addition to the catarrhal inflammatory changes seen in the foregoing condition, a catarrhal stomatitis is met with separately, particularly in animals that are poor and unthrifty. Heaped-up yellowish epithelial

deposits are to be observed, particularly on the tongue, hard palate, and inside the upper and lower lips, and may be covered with a slimy mucus. Some degree of salivation is usually present, but, as a general rule, it is not profuse. Occasionally a catarrhal condition of the buccal mucosa is also noted in prolonged cases of indigestion, and also in old-standing diseases, such as generalised tuberculosis.

Ulcerative Stomatitis.—Apart from this being met with in malignant catarrh, as already described, and in calf diphtheria, this condition is also seen independently. Ulceration of this character is noticed most in poor, unthrifty cattle, and several in a lot may be affected. The ulcers have a clear-cut appearance and heal very slowly. They often cause profuse salivation, and occasionally smacking of the lips. The chief positions in which they are noted are the anterior third of the tongue, affecting the edges mainly, and also of the lower surface, and around the incisor teeth and hard palate. Owing to the poor state of the animal this condition is often accompanied by lameness due to "foul" and abrasions, and also to a type of mud fever affecting the coronary region. If the ulceration is extensive the disease may terminate fatally in emaciated cattle, owing to their poor powers of resistance.

Calf Diphtheria itself ought not to cause a lot of trouble as regards differential diagnosis, since it is met with in younger animals than usually exhibit the classical symptoms of foot-and-mouth disease. Lesions are caused by the *Bacillus necrophorus* (Necrosis bacillus) after a preliminary injury to the buccal mucosa, such as is caused by teething. Salivation is often considerable, and a large amount of food is usually "quidded," and the temperature is raised from 2° to 3°F. Owing to the small size of the calf's mouth, examination is often far from easy, and a good deal of patience is required. Yellowish necrotic patches are to be found on the dorsum of the tongue and inside the cheeks, and are accompanied by a very putrid smell. Large sloughing of affected parts often follows, and death is a common sequel.

Pustular Stomatitis.—This condition is met with by itself or with an accompanying dermatitis in young cattle, and also in sheep. Lesions usually start in the form of swellings about the size of a small pea, affecting chiefly the insides of the upper and lower lips, and also the outside of the lower lip. Later these swellings burst and discharge pus, which causes the formation of crusts over the lower lip. Nothing, however, in the nature of a vesication is to be seen, so diagnosis should be fairly easy.

"Dirty Tongue" (Armagh Disease).—This is a benign form of stomatitis occasionally met with at the ports engaged in the shipment of Irish cattle. The writer has noticed it on only two occasions in recently-purchased Irish beasts. Unless the lesions are extensive, there is no salivation, and no general disturbance; consequently its existence is unsuspected. The tongue is the main seat of the lesions, but occasionally the lips are involved, but to a lesser degree. If the tongue is examined in the early stages, small dirty-brown areas are to be seen on its surface. These areas increase in size by extending excentrically, and if several are present they eventually coalesce. The central portion becomes detached, and the denuded area has a clear whitish appearance, whilst the periphery is a dirty brown. If the shedded portion is examined it will be found to consist of the superficial horny layer of the epithelium, and is easily broken up. On holding a piece up to the light, several small apertures can be seen in it, and this is caused by the penetration of the papillæ and somewhat resembles an incandescent mantle. After the shedding of the central zone, the tongue presents areas not unlike partially-healed foot-and-mouth vesicles, and if several are present their appearance is certainly alarming. Nothing, however, in the nature of a true vesication can be detected, and the lesions, on closer examination, will be found to be merely superficial, since the horny layer only of the epithelium is shed. In addition, the condition shows no tendency to spread, and there is an absence of foot lesions and no lameness. On one occasion, however, the writer saw this condition accompanied by a dermatitis involving the region of both fore fetlocks. In all probability this condition is much more common in this country than is generally imagined, but since the animal's general health is unimpaired, it is seldom detected.

Benign Stomatitis.—Several varieties of this condition are frequently met with and are often the result of traumatism. Other common causes are the ingestion of corrosive fluids, particularly in the form of medicine which has not been properly diluted. The causal factor cannot be detected in a large number of cases, and in many of these it is no doubt due to an injury from a foreign body. Salivation is often profuse, and if the tip of the tongue is involved a smacking noise, similar to that heard in foot-and-mouth disease, may also be noted. It has been the writer's experience that any lesion which involves the tip of the tongue, and is sufficiently large will, on account of its position, cause a smacking noise to be made when the mouth is spasmodically opened. This sound, therefore, although it naturally arouses one's suspicions of foot-and-mouth disease, is only one link in the chain of evidence necessary for its diagnosis, and it is due to many causes other than vesication.

A case of stomatitis illustrative of this was

met with about six years ago when foot-and-mouth disease was prevalent in the district, and the history of it is as follows: A three-and-a-half years' old red shorthorn bullock, which had been on the premises for six months, was noticed by the owner to be salivating and making a smacking noise when he walked across the field about 3.30 p.m. He telephoned me immediately and returned and watched the beast whilst awaiting my arrival. I did not arrive until 5 p.m., and during the whole one-and-a-half hours the smacking and salivation was continuous and pronounced. I kept the animal under observation for about 15 minutes whilst the owner was obtaining assistance to catch it, and during the whole period it made a smacking noise indistinguishable from that heard in foot-and-mouth disease. It then, somewhat to my surprise, started to ruminate, and did so in quite a normal manner, making about 50 cuts to each bolus. This continued for about ten minutes until I entered the field and caught the beast. Examination of the mouth revealed an area, about the size of a shilling, on the tip of the tongue, which had lost its mucosa, and a similar and rather larger area on the left side of the dental pad. There were no other mouth lesions, and no lameness, the feet being apparently normal. Temperature was 102·9°F., and eight other beasts and 20 sheep in the same field all appeared quite healthy. A provisional diagnosis of stomatitis was given, and the opinion expressed that it was of the benign variety, but it was decided to make a further examination the next day to be absolutely certain. On visiting the premises the following morning at 9 a.m. all the cattle in the field were grazing, and the suspect as heartily as any, and it had filled itself well during the night. The salivation and smacking had stopped. I watched it for a considerable time, during which it licked itself, and licked out its nostrils, which I have never seen a beast do in the initial stages of foot-and-mouth disease. When grazing, the tongue appeared quite mobile, and was used as normally for collecting the grass. The lesions now appeared deeper than those of foot-and-mouth disease, and it was not considered necessary to see the animal again.

A variety of stomatitis, similar to the foregoing, is met with fairly frequently as suspected cases of foot-and-mouth disease. These cases occur chiefly in the north of England, where they are usually known by the local name of "Northumberland tongue." The lesion is confined to the upper surface of the free portion of the tongue, and salivation and smacking are almost invariably present. The temperature may be raised two or three degrees, and although usually only one animal is affected, at times two or three in a lot may show symptoms. Although on examination the tongue may show nothing in the nature of a true vesication, the lesions often have an appearance somewhat suggestive of recently-ruptured vesicles. In these cases it would be a foolhardy procedure to give a definitely negative opinion at the first examination, especially if there is foot-and-mouth disease in the locality. By keeping the case under observation from 24 to 48 hours the non-appearance of foot lesions, and of further mouth lesions, and the absence of spread, set one's mind at rest. The cause of this condition is not known.

Actinomycosis.—This disease is extremely common amongst cattle, and in the Midlands is chiefly noted in the spring on the return of store cattle from the Fen straw yards. The causative factor is a vegetable parasite, the *Streptothrix actinomyces* (" ray fungus "), which is commonly found on barley straw and various grasses. Mouth lesions are very common in cattle, and usually affect the tongue, the parasite gaining access after a preliminary wounding of the mucosa, such as might be caused by the prehension of sharp foreign bodies, and the mastication of foodstuffs liable to cause injury (thistles, etc.). Another common avenue whereby invasion occurs results from injuries caused by the molar teeth, and frequently the fungus gains entrance into the jaw bone itself through the tooth alveolus, giving rise to the condition popularly described as " lumpy jaw." In the writer's experience, which is based on several hundred cases, approximately 65 per cent. of the mouth lesions of actinomycosis in cattle affect the sides of the dorsum of the tongue in the region of the third premolar, and the first and second molars.

Symptoms.—Actinomycosis is a disease of a slow and insidious nature, and often well-marked lesions take three weeks, or longer, to become fully developed. At the commencement difficulty is noticed in feeding, and if the tongue is affected it is not used as normally for collecting food. At about the same time a well-marked submaxillary swelling occurs, and is accompanied by salivation, which varies in degree according to the amount of tissues involved. On examination of the mouth, if the tongue is the seat of the lesion it will be found to present yellowish areas, which are indurated, giving rise to the popular and descriptive names of " wooden tongue " and " timber tongue." As a general rule, the induration is masked by a collection over it of partly masticated food, which is very often decomposed, but when this is removed it can easily be seen and felt. At a later stage ulceration of the mucous membrane occurs, and the area then assumes a reddish, granulating appearance, and is distinctly hard to the touch owing to the progressive fibrosis. It is not infrequent that, owing to the increase in size of the organ, the mouth is unable to accommodate it, and the tip protrudes between the lips. Nothing at all simulating vesication can be detected at any stage, but occasionally a smacking noise is heard

if the tip of the tongue is affected, and there is always a certain degree of salivation. Diagnosis is also assisted by the absence of foot lesions, and the fact that the temperature is normal, and although more than one beast in a lot may be affected there is never any tendency to rapid spread. When the cheeks are involved they are considerably thickened, but the lesions otherwise are similar to those on the tongue. The hard palate is fairly commonly attacked, and in conjunction with it there may be invasion of the sockets of one or more molar teeth. The lower jaw, in the region of the incisors, is less frequently affected, but invasion does occur there, and the writer has seen a few advanced cases in that position in which it has caused the teeth to drop out.

Actinobacillosis.—This disease is clinically indistinguishable from the foregoing, and consequently shows similar symptoms as regards salivation and the smacking of the lips, etc. The hard palate is the chief seat of the lesions, and it is very resistant to treatment.

Sublingual Swelling and Abscess Formation.—This condition is of fairly common occurrence, and the swelling often reaches the size of a hen's egg in a fully-grown beast, and is due to abscess formation in the submaxillary gland, or obstruction of its duct. The membrane covering it is thick and tough and usually great pressure is required to rupture it with the fingers, although on manipulation, pus may exude through the submaxillary duct. There is generally copious salivation and the animal is off its food, but it is easy to differentiate from foot-and-mouth disease on account of the position of the lesions and the absence of anything in the nature of vesication.

Dental Injuries.—These may be caused by loose, irregular or over-grown molars, or premolars, resulting in wounds of the tongue, cheeks or hard palate. Less commonly, the undersurface of the tip of the tongue is lacerated by a sharp incisor. In all these cases there is salivation, which varies in intensity according to the extent of the injury. It is generally easy to detect that the lesion is the result of some traumatism, since it is clean-cut and directly opposite the responsible tooth. These lesions usually heal rapidly on removal of the cause, but sometimes secondary actinomycotic infection supervenes, the fungus having gained entrance through the wound.

Injuries due to Foreign Bodies.—A great variety of foreign bodies are found in the mouth from time to time, and the following list contains some of the more important articles that have been met with by the writer, *viz.*, pieces of wood, thorns, portions of rose briars, pieces of tin, needles, wire (including wire snares) and parts of the framework of an umbrella. There is always some salivation, and it is often pronounced, but in these cases the general behaviour of the animal is usually plainly indicative of the cause of the trouble. Pieces of wood are met with at times firmly wedged across the roof of the mouth between the molar teeth.

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The following conditions are less likely to be confused with foot-and-mouth disease on account of the absence of lesions, but the writer has met with them all as suspected cases.

"Blaine."—This is rather a peculiar pathological condition which is at present imperfectly understood. The causal factor is unknown, but it is generally assumed to be due to a localised form of urticaria. It is noted chiefly in cattle that are being driven long distances by road, particularly heifers. Symptoms come on suddenly, and are often very alarming. There is a considerable swelling of the eyelids and consequent lachrymation, and also of the lips, and generally a copious salivation. The ears are often thickened, and this causes the animal to shake its head violently from side to side. Respiration is accelerated and distressed, and the attack may end fatally. Examination of the mouth shows nothing in the nature of a vesication, and no lesions have ever been found there by the writer. Other aids to diagnosis are the absence of foot lesions, and the fact that swelling often occurs of the anus, the vulva, and also of the mammary gland.

Lactation Tetany.—This disease, which clinically somewhat resembles milk fever, is frequently noted in cows which have been calved from two to three weeks to two to three months, or even longer. During the preliminary period of excitement there is often a copious salivation, and the rigors of the muscles, and the paddling and staggering movements of the hind limbs, are suggestive of lameness. This combination of conditions not unnaturally arouses the suspicions of a layman if there is any foot-and-mouth disease in the district, but a veterinary surgeon ought to have no great difficulty in arriving at an accurate diagnosis, since there is a complete absence of lesions in both the mouth and feet.

Choking.—This condition, too, has many times been reported as suspected foot-and-mouth disease, on account of the excessive salivation it causes. It is easily distinguished, however, by the entire absence of lesions in both positions.

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The ordinary physiological phenomena of rumination induce secretion of saliva, but the

amount is seldom in excess of that required for admixture with the bolus, and very little escapes from the mouth. According to Sir Frederick Smith ("Veterinary Physiology," 5th edition, p. 68), the salivary secretion of both submaxillary and sublingual glands is materially increased by the sight or smell of food, whereas the parotid is unaffected. In a healthy beast a clear string of saliva a few inches long, with a globular termination, is commonly seen escaping from the mouth, or one may be present at each commissure of the lips.

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B: FOOT LESIONS.

Although there are several conditions affecting the feet of cattle which may give rise to suspicions of foot-and-mouth disease, they are not nearly so numerous as are lesions in the mouth. Whereas any marked degree of salivation usually alarms the owner, frequently little attention is paid to lameness, particularly if only one animal is affected.

Foul of the Foot.—This condition generally affects one foot only, and usually a hind one, but occasionally two or more feet are involved, and several cattle in a lot may show lesions. Lameness is often acute, and the claws may be separated from each other owing to the swelling of the interdigital space, and also of the coronary region. The affected animal may shake the hind limbs in a very similar manner to that seen in foot-and-mouth disease. Examination of the foot, however, in the majority of instances, soon establishes a definite diagnosis, since nothing in the nature of a vesicle can be observed. Ulceration or abscess formation is to be found in the interdigital space, and the lesion has a rather characteristic foul smell. At a later stage a necrotic core often sloughs out, and this is generally followed by a rapid improvement.

Laminitis.—This disease is fairly common in cattle, and the form in which it is usually met with is as "travelling laminitis," in recently-purchased cattle which have been moved long distances by road. As a general rule, several cattle in a lot show symptoms, and often there is also profuse salivation as well, due to their having been hurriedly driven. This complication greatly increases the illusion of foot-and-mouth disease. No mouth lesions can be discovered, however, and salivation soon ceases when the animals have rested for a short time. On examination of the feet, the coronets are usually swollen and extremely tender, and the horn of the soles shows signs of excessive wear. Occasionally a certain amount of separation can be seen at the coronets, but it bears no resemblance to recently-ruptured foot-and-mouth disease lesions, and there is never, at any time, any semblance of vesication. A form of laminitis has also been observed in recently-calved cows suffering from septic metritis.

A condition due to a chronic form of laminitis has been observed in cattle fairly frequently by the writer. The two hind feet only may be affected, but usually all four are implicated. The feet present an appearance extremely like that seen in pigs recovering from foot-and-mouth disease, and which has been referred to as "thimbling," but usually only one animal in a lot is affected. The animal shows a lameness which varies in degree, and the state of the feet plainly indicates that the condition has been progressive for several weeks. The temperature is normal in an uncomplicated case. A new hoof is seen to be growing down from the coronary band, and the old hoof is superimposed on it. The horn of the old hoof often has a grooved, laminitic appearance, and the claws are overgrown and turn upwards. If left unattended the old horn is eventually cast, when the growth of the new hoof has been completed. Most of the cases of this description that have been seen by the writer have occurred in the spring in store cattle, on their return to grass from the Fen straw yards, and, in his opinion, the cause is as follows: In the autumn or early winter quite a large number of cattle are walked long distances from pasture to the straw yards, and as much as 30 miles is often covered, and the distance may be considerably longer. Since very little rest is allowed, and the cattle are made to walk at a quick pace, it is not to be wondered at that the weakest show symptoms of "travelling laminitis" on arrival. Several weeks on the hot manure of the straw yards hastens the separation of the old horn and stimulates the coronary band to further production, thus accounting for the characteristic appearance of the feet. The writer has also noted the condition occasionally in bulls, and in show cattle that have been overfed and under-exercised.

Pustular Dermatitis.—This has already been mentioned as accompanying a similar variety of stomatitis, but it is also met with separately. The writer has noted it most frequently in thin-skinned animals, particularly Friesians, and the various Channel Island breeds. The formation of pustules is to be observed, often affecting all four legs, and usually between the fetlock and coronet, but, in some instances, it extends up to the knees and hocks. The surface becomes cracked, and small beads of pus exude, and lameness is often present. Nothing in the nature of a vesicle is to be seen at any time, and diagnosis is generally easy. A variety of pustular dermatitis is often met with in cattle at pasture on marshy land, and among herds of cows during a wet winter. It is due to the limbs sinking in the muddy ground, and resultant infection, and it is very fittingly described as "mud fever."

Injuries to the Feet.—These are of common occurrence, and usually only one animal in a lot is affected, and in one foot only. Although the cause of the injury is not always apparent, at no time do the lesions at all resemble vesication, and they often have a clean-cut appearance. The following are some of the more common causes, *viz.*, picked-up nails, boot studs, bits of wire, stones in the interdigital space, tin, glass, etc. In winter, feet injuries are often caused by cattle walking over hard, frozen ground. The lameness is in direct proportion to the extent of the injury.

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The conditions in both the sheep and pig which are liable to be confused with foot-and-mouth disease are not nearly so numerous as in cattle. It is not considered necessary, therefore, in either instance to sub-divide them into mouth and foot lesions, but the various diseases, etc., will be discussed in the order of their importance.

SHEEP

Foot Rot.—This is an extremely common disease in sheep, and it is generally impossible to inspect a flock of any size without finding some evidence of it. In the majority of instances the lesions are confined to one or two feet, and it is only in exceptional cases that all four are affected. In old-standing cases of the fore feet, the sheep may assume a kneeling posture when grazing, but there is never any generalised systemic disturbance and prostration, such as is seen in foot-and-mouth disease, and the temperature remains normal. With regard to the lesions themselves, they too, when fully developed, present a totally different appearance. Nothing comparable with vesication is discernible, and the disease either starts between the digits or on the sole of the foot. By a slow ulcerative process it extends upwards towards the coronet, and the horn may become under-run, and the sensitive laminæ involved. In advanced cases pus formation is not infrequent, and the feet are very foul-smelling. Although certain forms are contagious, there is never any tendency to rapid spread, and the disease runs a very much slower course than foot-and-mouth disease. It has already been stated that foot rot may co-exist with foot-and-mouth disease; therefore, in all doubtful cases of this description reference should always be made to the dental pad.

"Orf" or Lip and Leg Ulceration.—This disease is fairly common in Great Britain, and particularly in Scotland. It may be described as a contagious form of pustular dermatitis affecting the lips and legs of sheep, and has recently been proved by Glover, of Cambridge, to belong to the ever-increasing list of diseases caused by an ultravisible virus. The necrosis bacillus was, for many years, thought to be the causative factor, but it is now definitely known that this is present merely in the rôle of secondary invader. In spite of being contagious, it does not spread rapidly, and since the lesions are essentially pustular an experienced clinician ought to have no great difficulty in distinguishing it from foot-and-mouth disease. The disease is seen in dry summers, and frequently in sheep on stubble, since the close grazing predisposes to the wounding of the lips, etc. Similarly, muddy fields, in wet weather, often result in the disease commencing about the limbs.

Symptoms are usually observed in several sheep of a flock at the same time, and the disease is particularly common in lambs up to a year old. In the early stages multiple small swellings are to be found around the coronets, lips and nostrils. These soon burst and discharge pus, and the parts then present a scabby appearance. Generally speaking, there is no tendency for the lesions of the lips to extend into the mouth, but occasionally there is a slight invasion of the mucosa near the edges. The leg lesions may extend, at times, from the coronet up to the knees and hocks, but the interdigital space is never attacked. Lameness is seldom acute, and there is never any prostration comparable with that seen in foot-and-mouth disease. The writer witnessed a bad outbreak of "orf" recently in lambs folded on marrow stem kale, the lips, etc., having been primarily wounded by the fibrous stems of the plants.

Injuries.—Wounds of the feet are fairly common in sheep, and are due to similar causes to corresponding injuries in cattle, and the remarks made regarding them apply equally to this animal.

SWINE

Rheumatism.—This disease is extremely common in the pig, and generally assumes an articular form with associated swelling of one or more joints, particularly the hock. Predisposing causes are cold, damp, dirty styes, and lack of sufficient litter. Lameness is almost invariably present, and at times is very acute. The affected joints are hot and painful. Nothing at all in the nature of vesication of either the feet or the supernumerary digits can be seen at any time, and there is never any shedding of the claws. Very little attention is paid to rheumatism by the average pig-keeper, and the affected pigs are described as merely being "off their feet." As a result of this casual attitude other causes of lameness are overlooked because the feet are not examined, and, as already stated, foot-and-mouth disease has been undetected in many instances for several weeks, whilst it has been the origin of a large number of outbreaks in the district.

Solar Sloughing of one or more feet is frequently noted in pigs, and is commonly caused by hard, cracked or irregular floors. Large pieces of the sole become detached from below upwards, and the process is generally attended by some degree of lameness, which is acute if the sensitive laminæ are exposed. It bears no real resemblance to vesication, since the latter condition (*i.e.*, vesication) starts around the coronet and interdigital space, and extends downwards.

Laminitis.—An acute type of "travelling laminitis" is sometimes seen in pigs, and is due to the same causes as the condition in cattle.

The foregoing cover the most important diseases of swine liable to be mistaken for foot-and-mouth disease, but the writer has also met with injuries of the coronary region in young stores which have been caused by struggling on the stye floor in convulsions. It is apparent in these cases, though, that the lesions are traumatic in origin.

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In concluding this paper, the writer would like to state that it has been his endeavour to describe the various conditions as he has met with them personally, and as concisely and briefly as possible. Finally, he desires to express his gratitude to the various senior officers of the Ministry of Agriculture under whom he has served, and particularly to Captain W. L. Sheffield, M.R.C.V.S., Divisional Inspector, from whom he received his preliminary training in foot-and-mouth disease, and who has since given him the benefit of his wide experience on many occasions.

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Discussion

The paper was circulated to members prior to the meeting and the President, Mr. H. S. Cockburn, called upon Captain W. L. Sheffield to open the discussion.

Captain W. L. Sheffield, in his contribution to the opening of the discussion, said: Mr. Eaton is to be congratulated on the excellence of his paper, and also on his choice of subject. The subject is one of great importance to both the practitioner and the official (part-time or whole-time), as each carries a grave responsibility when making a diagnosis, as an error might be followed by serious consequences. Under the Ministry of Agriculture's Order dealing with the disease, the practitioner who examines any animals and is of opinion that the animal is affected with foot-and-mouth disease, or if he only suspects it to be affected, must notify the fact to the authorities, who immediately put machinery in motion to prevent any spread of the disease. The official, whether of the central or local authority, also has the same responsibility as the practitioner, with the addition of that which is carried by the fact that a certificate of suspicion that disease exists, immediately prohibits the movement of all cattle, sheep and pigs within a radius of five miles of the premises.

Mr. Eaton has given us an excellent description of the various conditions, as met with by the practitioner in the field, and, as far as I am aware, the subject has not been dealt with in a paper, since the late A. Holman Berry, of the Ministry of Agriculture, read one before the Midland Association about 1918.

In his preamble, Mr. Eaton refers to the importance of the care which ought to be exercised with regard both to examination and to personal disinfection. This is very important, as failure to practice this care may be followed by disastrous results. Whilst proper personal disinfection is practicable when the veterinary surgeon visits the premises wearing rubber overalls and boots, it occasionaly happens that he finds himself dealing with a suspicious case, when foot-and-mouth disease was the last condition he expected to find. Under these circumstances the veterinary surgeon would be well advised to return home forthwith after carrying out such disinfection as was possible on the premises, *i.e.*, boots and hands, to change the whole of his clothing, and to have a bath. The clothing should be disinfected, and for this purpose nascent formaldehyde gas, generated by adding formalin to potassium permanganate in the proportions of one pint to one pound per thousand cubic feet of the capacity of the containing chamber, is recommended. The veterinary surgeon's motor car and equipment should also be carefully disinfected, and as far as circumstances permit, no further visits to premises on which cattle are kept should be made that day.

Diagnosis of a typical case of foot-and-mouth disease in cattle in which one finds a number of animals affected will not present any difficulties, but not infrequently in the early stage of an outbreak, when only one animal is affected, the typical picture of the disease is not present. It may be that lesions are absent from the feet though present in the mouth, or *vice versa*, or again, the lesions may be of a much milder character than those found in the contact-animals which later become affected. Difficulty in diagnosis may arise also in dealing with old-standing disease where the animals have passed through the acute stage and are on the way to recovery, and in such cases may have to be based on the presence or absence of new tissue at the seat of the acute lesions, as, for example, the growth of new hooves.

Dealing with the conditions described, the "smacking" sound is a very common symptom, but is not characteristic of foot-and-mouth disease only. It is quite frequently met with in other conditions, particularly those in which the tip of the tongue is involved. Whilst agreeing with the writer generally that healing of mouth lesions is rapid, I think that evidence of existence of the lesions on the tongue may be found for a longer period than is implied, although this evidence may be limited to the line of demarcation of the new and old tissues on the mucous membrane, and, of course, foot lesions are present for some weeks after the vesicular eruption. It is usually noticed that store cattle at grass shew less systemic disturbance than dairy cows which are housed, amongst which the disease spreads rapidly. In sheep and pigs little or no salivation is seen as the result of mouth lesions, and the tongue lesions are much less pronounced than in cattle. All the conditions described by Mr. Eaton are met with when making official

investigations into reported suspected outbreaks, malignant catarrh being the commonest. Apart from the question of differential diagnosis, malignant catarrh is of interest on account of its prevalence, and the fact that nothing definite appears to be known about the causation. Perhaps Mr. Eaton could give some information on this?

Captain H. L. Torrance: I should like to congratulate Mr. Eaton on giving a paper of such great practical value, on a subject of the utmost importance to every veterinary surgeon, because no one knows when he may be called on to examine a case of suspected foot-and-mouth and be up against a real difficulty. The responsibility of saying definitely that it is not a case of foot-and-mouth is a big one, and it behoves us to act with the greatest caution. When there is any doubt in one's mind, the wisest procedure is to leave the final diagnosis to the experts, *i.e.*, the veterinary staff of the Ministry of Agriculture.

None of us has any difficulty in a typical case, especially where foot-and-mouth exists in the neighbourhood, but when it is suspected to be a fresh outbreak, the difficulty is much greater.

Mr. Eaton has discussed his subject so thoroughly and profoundly that I have little to add by way of differential diagnosis. I am sure we all agree with him in his emphasis on the importance of pigs in the dissemination of the disease. Foot-and-mouth is so much associated with cattle that I do not think the pig keeper realises the possibility of the existence of this disease in his herd when a number of pigs show lameness at the same time. When this happens, and the pigs are fat, or nearly so, he generally has them slaughtered, and once they have been in the scalding tub and the hooves removed, foot-and-mouth is very difficult to diagnose, and in many cases impossible. Where one's suspicions are roused it is advisable to find out where the pigs have come from, and arrange to have any remaining stock on the premises examined.

My experience of foot-and-mouth has taught me that the disease generally runs a typical course, and where there is any doubt about the case being foot-and-mouth, as a rule it is not.

Now I am going to say something so simple and elementary that I trust it will not be considered an impertinence, and that is with regard to the examination of a suspected case:—

1. Do not get into a panic.
2. Have the animal properly secured so that you can make a thorough examination.
3. Have a torch to examine the mouth and have a cloth so that one can get a secure grip of the tongue to hold it in any desired position.
4. Wash each foot clean with a brush and water.
5. Do not be afraid to accept responsibility.

Captain O. V. Gunning said he thought it was a pity there was no middle line in reporting cases. There were numerous cases where one did not actually suspect the disease, but at the same time, considering all there was at stake, did not feel justified in taking the responsibility. However, as soon as a case was reported to the police as suspected, restrictions were put in force causing considerable inconvenience. He would like to ask what attitude one should take towards such cases. He desired to congratulate Mr. Eaton on such a valuable paper, which he was sure would be retained by all for future reference.

Mr. Wilkinson congratulated Mr. Eaton on his very comprehensive paper. His own experience had extended to five outbreaks of foot-and-mouth disease, and in each one, the classical vesication was apparent, and made diagnosis easy. It was certainly time that a paper such as Mr. Eaton's was written, in view of the fact that it was several years since the last account of these conditions was given.

He had only one criticism to make, and that was that he believed Mr. Eaton had got mixed up between actinomycosis and actinobacillosis. He was under the impression that the typical "wooden tongue" was an actinobacillosis, and that the "lumpy jaw" type was due to the "ray fungus" *Actinomyces bovis*. He admitted that Mr. Eaton's account was the same as that to be found in the "Encyclopœdia of Veterinary Medicine," but he believed that the cart had been put before the horse there also.

The Reply

Mr. Eaton, replying to the discussion, said: My thanks are due to you all for the kind way in which you have received my paper, and particularly to Captain Sheffield, for opening the discussion, to Mr. Ironside, for having copies of the paper prepared and circulated, and to Dr. Andrews for his courtesy in forwarding these excellent preserved specimens for examination. I will now endeavour to reply to the various points that have been raised.

Captain Sheffield mentions the necessity for precautionary measures on the part of the practitioner who meets with a case of foot-and-mouth disease unexpectedly, and has not the opportunity, therefore, of wearing rubber overall clothing. In such instances, it is essential that a complete change of clothing be made, and every garment likely to be contaminated should be subjected to fumigation with potassium permanganate and formalin of approved strength. In addition, one might also fumigate the car in a similar manner.

It has been my experience that the disease, at any rate in the first animal affected, by no means always follows the typical course. This is particularly noticeable in the adaptation of virus from one species of animal to another (*e.g.*, pig virus to cattle) and a case of this description came under my notice early this year during the widespread outbreaks of disease from a common origin among pigs in the South of England. In this particular instance, the initial beast of the outbreak showed merely an atypical dorsal exfoliation of the tongue, and no other lesions in either the mouth or feet. When the second crop of beasts went down, however, they presented typical lesions in both positions, so I think it is reasonable to assume that the virus had become exalted by passage through the primary animal.

I agree with Captain Sheffield that "smacking" is by no means diagnostic, and that it can occur in diseases other than foot-and-mouth disease, notably malignant catarrh and actinomycosis of the tip of the tongue.

Of course, I was referring solely to mouth lesions when I stated that healing had been found to be complete ten days after confirmation of disease. Foot lesions can be detected even after several weeks, and their age estimated by the growth of new horn, and the degree of separation. As stated by Captain Sheffield, diagnosis is often difficult in sheep, and, generally speaking, these animals show greater systemic disturbance than cattle. The remarks made with reference to old-standing disease in pigs are well illustrated by the preserved specimens.

With regard to differential diagnosis, vesicular stomatitis admittedly presents many pitfalls, and

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a waiting policy has often to be adopted before one can be certain.

Possibly a number of cases of so-called "Northumberland tongue" are due to this condition, but are not seen until after the vesicle has ruptured. Vesicular stomatitis, as described by various continental and American writers, is totally different from the disease met with in this country. It is stated by them to be primarily a disease of horses, and due to a virus the nature of which is not yet discovered, but it is not a filter-passer.

Various fungi, plants, and weeds in forage have been suspected of causing the disease in cattle, but nothing definite has been proved.

There is great diversity of opinion regarding the cause of malignant catarrh. Nocard ascribes it to an organism of the fowl cholera type—the *Bacillus bovisepticus*, which he has found in the nasal cavity and larynx of affected animals, and states that it is assisted later by streptococci and other pyogenic bacteria causing suppuration and necrosis of tissues.

Huytra and Marek, in their well-known work, state that symptoms are due to bacilli of the colon type. I am of the opinion that in these particular instances, the normal bacterial flora of the part have been incriminated and invested with a pathogenicity which they do not actually possess.

A well-known English clinician, Mr. F. T. Harvey, of St. Columb, Cornwall, assumes that malignant catarrh is an acidosis, and treats it quite rationally by the administration of relatively large quantities of sodium chloride and sugar per stomach tube. My own personal view is that malignant catarrh is simply a toxæmia, usually brought about by change of conditions as regards feeding, and weather, and perhaps housing, and accentuated by any debilitating cause which is likely to lower the animal's power of resistance. The smell in malignant catarrh is, as stated in my paper, very offensive, and this is often helpful in arriving at a diagnosis. To me it appears to be very similar to the smell given off by decomposing vegetable matter, and I tentatively suggest that that is what it really represents. There is usually an absence of rumination, and the many digestive processes are completely disordered in these cases, as a result of a diminution in quantity or temporary cessation of the various digestive juices and secretions. Then, in my opinion, regurgitation up the œsophagus occurs, producing the characteristic fœtid odour.

The points raised with regard to pustular stomatitis, "dirty tongue," and "travelling laminitis" are in the nature of amplification, and do not call for any answer. "Orf" is, of course, pustular in nature, and not vesicular, and ought essentially not to cause any great trouble in diagnosis.

Mr. Auchterlonie mentioned the treatment of an isolation case among a large herd of dairy cows in 1924. I well remember this particular case, and recall that feet lesions, and their complications, proved particularly troublesome, and that abortions were fairly frequent.

Mr. Torrance has called attention to the public health aspect of the disease and, very rightly, stresses the impossibility of clinically definitely diagnosing it in pigs after removal of the hooves. I must thank him too, for his very lucid glimpses of the obvious *re* the examination of a suspected case. In the excitement of the moment these points are easily overlooked.

With regard to Captain Gunning's remarks concerning the reporting of suspected cases, I think in such instances a thorough examination should be made, taking, of course, the usual precautions, and then if a definitely negative diagnosis cannot be arrived at, one should always err on the side of safety and report to the police. Speaking from the practitioner's point of view, it is an interesting psychological fact (at any rate, as far as my own personal experience goes) that if a farmer suspects foot-and-mouth disease, and calls in his own veterinary surgeon to examine the animal he will practically never inform him of his suspicions. Thus the additional onus of reading the client's mind is placed on the practitioner, besides the responsibility of forming a diagnosis.

I was glad to have Mr. Wilkinson's correction with regard to actinomycosis, and actinobacillosis. "Wooden tongue" is extremely common in the district in which I practise, and a few years ago, I had nine cases under treatment for one farmer at the same time, and seven of them were tied up in a row in a shed.

There has been mentioned during the discussion an interesting suspected case among pigs, which showed indefinite lesions of the feet and mammary gland, and at a later stage some degree of salivation, and the opinion was expressed that they were suffering from foot-and-mouth disease. By a process of deduction, arguing on that hypothesis, one might reasonably assume that all men who walked with a limp, and had a fixed stare, had wooden legs and glass eyes. A definite positive diagnosis can only be established in the initial animal of an outbreak, or the initial outbreak of a series, by the exhibition of the typical classical vesication in both the mouth and feet.

In conclusion, I should like to thank you once again for the extremely kind way in which you have received my paper.

Goats are usually considered to be quite resistant to tubercle bacilli. Griffith inoculated two goats subcutaneously with avian tubercle bacilli. One of the inoculated goats produced five kids in three births and none of them showed any evidence of the disease; however, the mother of the five kids yielded tubercle bacilli in her milk for five years after the inoculation. That the eliminated tubercle bacilli were virulent at the end of five years was evidenced by the fact that they produced fatal tuberculosis in fowls.—*Bio. Abs.*

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The *Pasteurella boviseptica* is found in the upper air passage of about 15 per cent. of normal cattle, according to Jorgenson. These organisms are not pathogenic under ordinary conditions. Recent experimental findings appear to corroborate former statements that hæmorrhagic septicæmia is most likely to occur in animals that have been subjected to unfavourable conditions, such as improper feed and fatigue or chilling incident to shipping.—*Vet. Med.*

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Protests were made at a meeting of the Carmarthenshire Agricultural Committee against allegations made by members of public bodies and by medical men concerning the quality of milk produced and the number of tuberculous cows in the country. It was pointed out that the percentage of tuberculous cows in Carmarthenshire was only 20, as compared with 40 in England, while the number of cows giving tuberculous milk was less than 1 per cent.

The Veterinary Record
September 2nd, 1933.

DIFFERENTIAL DIAGNOSIS

A LAMENT often heard from older practitioners, medical and veterinary, is that with the advent of many laboratory aids, the modern graduate does not come to rely on his own powers of comprehensive examination of his patient. In other words, he fails to become proficient in the art of clinical diagnosis; he learns instead to trust more and more, when in any difficulty, on piecing together the reports, often flimsy in substance, upon the patient or materials taken from the patient, of a round of specialist workers.

We must admit at once that some of these newer aids have been invaluable. Who can now doubt but that a diagnosis of anthrax can only be made with surety by a man trained to the use of a microscope, or that test with a laboratory product, mallein, ought to be resorted to when there is suspicion of glanders? In an instructive report upon an official visit to Spain, Captain Glyn Lloyd, in the August issue of the *Journal of the Royal Army Veterinary Corps,* mentions that in that country, where in the past things have been different, glanders in horses is about as prevalent as tuberculosis is among cattle in this country.

There is indeed, with increasing recognition of our debt to laboratory research and a realisation of the prospects of its future development, a tendency for the practitioner to moderate his interest in several diseases, so much have these now fallen within the purview of laboratory workers or whole-time officials. Among these diseases is foot-and-mouth disease; the reader will call to mind several others. Research into foot-and-mouth disease, since the costly outbreaks of about ten years ago, has been in the hands of a Departmental Committee. We may rest content that this powerful scientific body, through its staff of workers, now all veterinary men, will use every resource known to science to clear up the task allotted to it; and, in due time, it will inform us of better means of control than we have adopted until now, and, at all events, we shall know from it the truth.

In the meantime, we would invite our younger readers particularly to pause awhile over Mr. Eaton's article, which we publish in this number, in so far as it portrays conspicuously the fundamental utility of accurate clinical diagnosis, connoting as this does a prolonged training and experience in direct touch, among their ordinary surroundings, with our animal patients. Equipped with knowledge of this kind only, Professor Simonds and other veterinarians, in the '60's of last century, represented to the Government of the day what they insisted was the only proper method for the eradication of cattle plague. The plan which they advocated succeeded, after the more scientific (as it was then thought) methods of the medical authorities had failed. And to-day, the methods which are adopted for the control of foot-and-mouth disease—most successfully, when we compare our good fortune with the fate of neighbouring continental countries—are essentially those same cattle plague measures in which prompt and reliable diagnosis by qualified veterinary surgeons plays a pivotal part. So much, then, is to be learned about the sure diagnosis of one disease. It need hardly be stressed what are here the serious responsibilities of the practitioner—how much diagnosis, if correct, may enhance his local prestige or, if faulty, redound to his lasting discredit.

In the new five years' course of study for our Diploma of Membership, the Council of the R.C.V.S. have laid down, with great wisdom, we think, that six months must be spent by the student in practice and that he must present to his examiners a note-book containing a record of the clinical cases he has seen in this time. This part of the training was undoubtedly becoming imperative, with the increased cost of qualification and the recruitment of the profession more and more from the sons and daughters of the comfortable classes in urban areas and less and less from among the classes with inbred knowledge, the sons of the farm and forge. It is earnestly to be hoped that the examiners, in the stress of their duties, will not regard the above stipulation as perfunctory—as it is, we fear, often so regarded in the practical examinations of universities and colleges, in scientific subjects—but that they will examine the merits of the student quite as much from his powers of making accurate observations upon his cases and correctly reporting them as they will upon his aptitude to memorise class notes and give ready utterance to them. In this way, we may look forward to the time when future generations of practising veterinary surgeons will not be lacking in ability, when compared with their laboratory colleagues, to record their observations, and Hunting's memorable dictum that the skill of the skilful practitioner dies with him will no longer prevail. In Continental schools, semeiology, the study of

symptoms, has long been stressed as an important feature in the veterinary curriculum, and there are standard text-books, such as those by Malkmus and by Marek, on the subject.

It is somewhat of a paradox that when the new five years' course of study (having in mind the great increase in factual knowledge, mainly, be it said, the result of the efforts of laboratory workers) was first mooted in the Council of the R.C.V.S., insistence upon a portion of the course being spent in veterinary practice came from the "father" of veterinary research in this country, Sir John M'Fadyean. The old, experienced researchers know full well that an essential background to their tasks is an accurate supply of information concerning the matters that exercise most intimately the minds of their clinical colleagues.

Finally, we may say that when a series of pertinent and practical questions are posed, as they were in a letter by Mr. J. Campbell Hill in a recent issue of the *Record*, about the ability of our graduates to make an impression, for the public weal, upon the problem of tuberculosis, we insist that we have good right, if we are allowed to argue by analogy, to claim that at least we need not adopt an attitude of *non possumus*, while we can turn out men from our schools to combat tuberculosis in the way that they are called to deal with foot-and-mouth disease, not to mention what they have already achieved with, for example, glanders and cattle plague.

CHEMICAL INCOMPATIBILITIES OF QUININE SULPHATE

The composition of the precipitates given by acid solutions of quinine sulphate on the addition of the alkali salt of the acid has been investigated by Bartlen, Eisenberg and Lee (*J. Amer. Pharm. Assoc.* ex. *Pharm. Jour.*). It has usually been stated that the precipitate is the quinine salt of the acid used, but this might appear improbable, since the precipitation does not take place on the addition of the acid alone. The authors find that the precipitates forming on adding potassium acetate, potassium citrate, potassium hypophosphite, and sodium salicylate respectively to solutions of quinine sulphate in aqueous acetic acid, citric acid, hypophosphorous acid, and hot distilled water do, in fact, consist, in each case, of the quinine salt of the acid radicle. They suggest that the precipitation is due to the common ion effect.

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A summons against a woman for allowing her terrier to drink from a fountain cup in St. James's Park so as to be likely to cause pollution of the drinking water in the fountain was dismissed recently at Bow Street Police Court.

Clinical Communications

FRACTURE OF THE OS CALCIS IN A MARE

HENRY TAYLOR, F.R.C.V.S.
Haywards Heath

The subject was a young thoroughbred mare used for hunting, which had gone lame in front whilst the owner was hunting in Scotland. She returned to this area and was examined by a veterinary surgeon, who diagnosed navicular disease. Later on he unnerved her and then she was sent, about a fortnight after the operation, to a farm.

I was requested to see her one morning, as she was unable to rise, although she had been standing up a few hours previously. She was in a large loose-box bedded with peat moss, lying on her side and sweating slightly. We tried to get her up, but even with slings we were unsuccessful. The peculiar action of one leg caused me to examine the hock, and there I found a fracture of the os calcis about one-third from the point, with rupture of some of the attachments of the Achilles tendon. It was no good keeping her, and destruction was advised. Later on in the day, as the owner wanted her buried on the estate, I was asked to destroy her myself. On attending to do this, it was noticed that the ends of the broken pieces of bone had penetrated the skin and were protruding, doubtless as the result of a struggle to rise.

Why the fracture should have happened is rather a mystery; the operation wounds from the neurectomy seemed excellent, there was no swelling of the fore-legs, no evidence of a struggle in the first instance, nor any sign of kicking.

Sometimes fractures do take place most unaccountably. I remember a horse trotting along the Strand, London, some 30 years ago, breaking his suffraginis bone into about 20 pieces.

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ULCERATION OF THE ABOMASUM AND PERFORATION OF THE OMASUM IN A COW

HENRY TAYLOR, F.R.C.V.S.
Haywards Heath

As the diagnosis and comparative rarity of ulceration of the fourth stomach in bovines renders this pathological condition interesting, it may be worth while to record this case.

The subject was a cross-bred shorthorn cow aged about five or six years, with no history of any previous illness.

About December 11th she was noticed to be slightly off her food and the milk yield to be decreasing, and as she was no better on the 13th,

the owner sent his man for some medicine. He described her symptoms, and as these appeared to indicate a slight attack of indigestion without any grunting, a pint of linseed oil, followed by some powder containing ammon. carb., soda bicarb. and nux vomica was prescribed. The oil was administered and in a few minutes there was a watery evacuation of a black, tarry fluid of a fœtid odour, which was quite unaccountable, as the previous motions had been fairly normal. During the next four days this diarrhœic condition went on. The puzzling part of the case was the fact that the cause was obscure. The animal was free from pain and looking quite bright, though not feeding at all. Chlorodyne, sod. bicarb., turpentine and treacle were administered, then iron and sulphuric acid, but all with little or no effect. Once or twice she became tympanitic but the two latter drugs relieved the condition.

On the sixth day (December 19th) her appearance was dejected, but there seemed to be no pain; the abdomen seemed to be much distended, however. She died next day (December 20th). The case was diagnosed as enteritis of indeterminate origin. It was not unlike an acute attack of Johne's disease.

Post-mortem Examination.—The tissues under the skin in the sternal region were infiltrated with a gelatinous fluid. The rumen contained an enormous amount of food, very liquid in character. In the region of the omasum there was some peritonitis with adhesions between that stomach and the abdominal wall. On closer examination it was found that there had been a slight perforation of the organ which, of course, accounted for the peritonitis and the gelatinous exudate in the sternal region. Instead of the omasum being full of dry food, as one usually finds, it was full of liquid ingesta; all the leaves or folds of the mucous membrane were in shreds, many having no attachment. The contents were dark brown in colour.

No foreign bodies were found in the reticulum —not even a nail or bit of wire.

The abomasum was remarkable for the presence of ulcers, varying in size from that of a shilling to that of a crown piece, and these numbered some six or seven. The edges were smooth, giving the impression that they had been in existence some time. Evidently some of them had been recently bleeding, which accounted for the black diarrhœa. There were no tuberculous lesions in any part except for two small pea-like areas in the mediastinal gland.

Remarks.—As there were two distinct pathological conditions in the above case, *viz.*, disintegration of the leaves or folds of the third stomach, and ulcers in the fourth, accurate diagnosis was undoubtedly difficult. One would have thought that the lesion in the fourth stomach would have caused such an amount of pain that it would have been evident during life.

In the course of some 34 years' experience I cannot recollect a case similar to this one.

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A MONKEY DENTAL PATIENT

HENRY TAYLOR, F.R.C.V.S.
Haywards Heath

A lady recently rang me up on the telephone requesting me to cut a monkey's canine teeth as he had bitten her companion rather badly on the arm, and saying that in Trinidad, where he came from, they always did that.

Not being an authority on that kind of patient, I consulted my old friend Professor Wooldridge, who attends at the Zoological Gardens, and he informed me that one could cut off about an eighth-of-an-inch with bone forceps without getting into the pulp cavity, which was my problem; also that they are pretty good subjects for chloroform or A.C.E., but that they take it exceedingly rapidly, so one has to be careful.

We anæsthetised the monkey with a mixture of ether and chloroform, holding him in a sack, and getting him well under; then we chipped off the requisite amount from the four canine incisors. He was very funny when coming to and the owner suggested that we should go away till he recovered. I saw my patient afterwards, when there was a swelling on the face below the eye, and it is probable that there was a little toothache from infection of the tip, though the affected tooth had the least amount taken off of any and the owner said she thought we had not excised enough off that one.

THE PORCHESTER ADDER CATCHER

The death has occurred at the age of 80 of Mr. James Smith, at one time an employee of the Southern Railway, who had gained some fame as an adder catcher. According to the *Portsmouth Evening News,* his captures were in great demand by the London hospitals because of their valuable fat, which realises as much as 5s. an ounce. His favourite hunting ground was above the tunnel at Fareham, and he has caught as many as three dozen on a Sunday morning when assisted by his son. His best time of the year was in April and May after the reptiles' winter sleep and before they had thrown off the fat accumulated during winter. The fat, says the *Portsmouth Evening News,* is an invaluable antidote for snake bites, and many a big game hunter has carried into the jungle snake fat that has come off the tunnel at Fareham.

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Public Health (Imported) Food Amendment Regulations, 1933.—In connection with this circular, recently issued by the Ministry of Health, a correspondent writes: "It is noticeable that none of the South American countries certify their products '*examined ante-mortem and post-mortem and free from disease,*' while U.S.A. and all our Dominions do so. South America simply say 'inspected.'

"A serious defect is that bacon from any country can be admitted without a certificate. —*Vide Meat Trades Journal,* leading article, June 29th, pp. 826-7."

Abstracts

[Canine Distemper. The High Antigenic Value of the Virus after Photodynamic Inactivation by Methylene Blue. Perdrau, J. R., and Todd, C., *F.R.S. Jnl. Comp. Path. & Ther.* xlvi. pt. 2. 1933. p. 78.]

In this paper it is shown that by exposing to a pointolite lamp for varying times a mixture of equal parts of a solution of methylene blue (1 in 50,000) and of the supernatant fluid from a 2 per cent. centrifuged saline suspension of infected ferret spleen, the virus was not only inactivated but the resultant suspension provided a vaccine of considerable value.

Ten minutes would appear to be the shortest time during which it was possible to inactivate the virus of distemper and at five minutes it was found that the virus was still capable of producing the disease.

An interesting result, entirely unexpected, which followed an experiment to confirm previous ones was observed when a number of ferrets injected in duplicate with mixtures of dye and virus which had been inactivated for periods of 10, 15, 20 and 30 minutes: all, including the controls, developed and succumbed to the unmodified disease within 12 days. Investigations showed that the spleen used as a source of virus was only one day old—when the experiment was repeated with 17-days-old spleen all the vaccinated ferrets proved to be immune whereas the controls died of uncomplicated distemper. The explanation offered by the authors is that in the case of the one-day-old spleen some of the tissue cells were still alive and were therefore capable of protecting the virus against the photodynamic action of the methylene blue. The authors proceed to argue that if this explanation is correct it should be possible to abolish the protective action of supposed living cells by filtration of the supernatant fluid through one of the "Gradocol" membranes made by Dr. W. J. Elford.

An experiment designed to support this contention proved it to be correct.

Experiments were also carried out with a view to ascertaining the effect of prolonged exposure to the pointolite lamp and over-irradiation with sunlight, as well as the keeping qualities of the inactivated virus.

It was found that a satisfactory vaccine dried immediately in the dark and kept in the cold preserved its antigenic value for at least two months. Owing to limited supplies, only one experiment was carried out on dogs, but in this case both the dogs used (one received 20 c.c. and one 2 c.c. of vaccine) were subsequently proved to be immune.

An advantage of this method of vaccination over that advocated by Laidlaw and Dunkin is that whereas the effective dose of formolised vaccine contains at least 10,000 minimal infective doses of virus it represents 100 times that of an effective dose of methylene blue vaccine. Furthermore, in the latter the greater part of the splenic tissue is removed, thereby eliminating the local swelling and persistent induration which may occasionally be observed at the site of inoculation in animals receiving formolised vaccine.

The work opens up yet another new line in the field of work on virus diseases as well as providing an alternative method of vaccination against dog distemper.

G. W. D.

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[Memoir on the Campaign against Contagious Granular Vaginitis of Cattle by Breeding Syndicates. (Trans. title.) Caillot. (1933.) *Bull. de l'Acad. Vét. de France.* vi, 3, 129-134.]

The writer considers that a predisposing cause of the disease is defective hygienic conditions, though the actual cause is the specific streptococcus.

Contagion may be direct, as by service, when the bull infected from a diseased cow infects other animals at subsequent services. Indirect contagion may occur through the contamination of the hands or clothes of the personnel or utensils, but more especially by the ingestion of contaminated food or water. The author verified this hypothesis by numerous experiments, three of which are quoted as follows:—

(1) An emulsion in water of the vaginal mucus of infected cows was administered *per os* to six heifers. Lesions were visible on the 20th day in three subjects, the 28th day in two and the fifth week in the other. Six controls remained unaffected.

(2) The sprinkling of forage with an emulsion in water of infected vaginal mucus and feeding to four heifers was followed by typical lesions in from three to five weeks. The two controls remained healthy.

(3) Direct contagion was demonstrated by rubbing for five minutes the vaginal mucosa of three heifers with a cotton-wool swab dipped in muco-pus. Acute infection supervened in three days, the controls again remaining free.

Caillot considers that vesicular vaginitis is the acute form and granular vaginitis the chronic form of the same disease.

The complications are generally sterility, though frigidity sometimes occurs in heifers, and, rarely, orchitis occurs in bulls.

The prophylactic measures recommended include rigorous hygiene of buildings, the personnel and equipment; frequent inspections of health; lavage of the genital organs before and after service; examination and quarantine of additions to the herd; refusal of service to

suspected cows, and slaughtering of incurable females instead of repeatedly putting to bull after bull.

The treatment recommended for the acute form is irrigation with potassium permanganate solution twice daily and the introduction into the vagina at night of an icthyol bougie and the administration of diuretics. For chronic cases refractory to the above treatment a radical treatment is recommended to destroy the vulval and vaginal mucosa by liberal cauterisation of the whole mucosa, with a silver nitrate stick. Recovery is generally perfect at the end of three weeks. The cow is served at five to six weeks after treatment, receiving a vaginal irrigation with sodii bicarb. solution before service. Conception occurs in eight cases out of ten. The writer is sceptical of the effects of vaccine or serum therapy, but suggests the collaboration of breeding establishments in combating the disease.

J. S.

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[**Fractures of the Pisiform Bone in the Horse and their Radiographic Diagnosis.** (Trans. title.) Marcenac. (1933.) *Bull. de l'Acad. Vét. de France.* vi, 4, 159-162.]

The writer mentions as causes of this accident kicks from other horses, falls on fixed objects or violent contraction of muscles at the moment of great effort. Details are given of two cases, one of which occurred during a gallop. A few hours afterwards pain, heat and tumefaction were noticeable on the postero-external surface of the knee. With the limb raised, the pisiform bone was taken between the finger and thumb and one could detect abnormal mobility of its posterior half as well as a weak and irregular crepitus. Clinical diagnosis was confirmed by X-rays, which showed a complete vertical fracture of the bone. The second case was caused by striking a bar heavily in jumping. There was marked lameness with considerable œdema over the external surface of the knee. On palpation neither crepitus nor abnormal motility could be detected, but fracture was apparent after examination by X-rays.

J. S.

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[**Fracture of the Pisiform Bone, with a Radiograph taken a year later.** (Trans. title.) Bouchet. (1933.) *Bull. de l'Acad. Vét. de France.* vi, 4, 162-165.]

Fracture of the pisiform bone in this case was caused by falling in a steeplechase. Lameness was intense and the posterior surface of the knee was swollen, but nevertheless it was possible to detect the displacement of bony particles and crepitus. Forced flexion of the limb appeared very painful. Fractured pisiform bone was diagnosed and a favourable prognosis was given. A radiograph showed a vertical fracture of the bone, the posterior half being the larger. It is considered that an optimistic prognosis may be given if fracture does not involve the articular surfaces. A blister was applied after the original hæmorrhagic œdema was absorbed. After two months the mare appeared cured, and palpation did not evoke evidence of pain. A radiograph, however, showed that union of the fractured portions of the bone had not occurred. Improvement continued and the mare was put into training and ran in public, but when radiographed again twelve months after the accident the appearance was the same as previously. It was found that the displaced portion of the bone accompanied the flexor muscles of the metacarpus in their contraction instead of serving as their terminal point of attachment.

J. S.

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[**Researches on Sheep Pox in French Sudan.** (Trans. title.) Curasson and Didier. (1933.) *Bull. de l'Acad. Vét. de France.* vi, 5, 202-206.]

Sheep-pox was first diagnosed in 1925, though the natives have recognised it and practised ovination from time immemorial. The natives inoculate infective material into the tip of the ear with an acacia spine and the point of a knife.

The disease is not particularly serious in the indigenous sheep, though it has certain peculiar characteristics; for instance, the cutaneous lesions do not weep, and instead of ending in the formation of a pustule, end by the formation of a necrotic core. In cross-bred merino-macina sheep the disease is more serious and frequently assumes a nervous form. An interesting observation was that macina ewes, which are very resistant, when served by merino rams abort in large numbers, and the fœtus is covered with the sheep-pox lesions, which do not exist in the ewe, the fœtus inheriting the paternal receptivity.

A comparison of the Algerian and Sudanese viruses showed them to be identical and thus the atypical nature of the disease is not due to a character of the local virus but to the marked resistance of the sheep of the country.

J. S.

RELATIVE NUTRITIVE VALUE OF CHILLED AND FRESH MEAT

The Research Committee of the Royal Agricultural Society has inquired of the Department of Scientific and Industrial Research regarding the relative merits of fresh meat as compared with tinned, chilled, or frozen meat. A reply had been received from the Ministry of Health stating that, on the knowledge at present available, there is no recognisable difference in nutritive value as between frozen or chilled and fresh meat of similar quality.

Further, there was no evidence that modern methods of canning affected the nutritive value to any greater extent than ordinary cooking.

Reports

WEST RIDING COUNTY COUNCIL: VETERINARY DEPARTMENT

CHIEF VETERINARY OFFICER'S REPORT, 1932-1933

The attention of every veterinary surgeon interested in the recommendations of the Reorganisation Commission for Milk is directed to the sixth annual report of the Chief Veterinary Officer for the West Riding of Yorkshire, which has just been issued; for one ventures to believe that whatever views many may have regarding whole-time veterinary services, there are at least few, if any, who, after reading Major Rabagliati's report, could deny that the activities of the West Riding veterinary staff are proving of supreme value to the public, to the milk producer, and, most important of all, to our profession itself.

To review the report adequately would require a very considerable amount of time and space, for it consists of 48 pages of condensed information; one must deal most briefly, therefore, with its outstanding features.

After an interesting introduction, in which Major Rabagliati indicates that the recently-published reports of the Reorganisation Commission for Milk and the Standing Committee of the Council of Agriculture for England on the country's milk supply both strongly recommend the formation by local authorities of veterinary departments on similar lines to those already adopted in the West Riding, the report goes on to describe the work done, as follows:—

The Diseases of Animals Acts and Orders

During the year, 78 suspected outbreaks of anthrax were reported and on investigation only six of these were confirmed.

Outbreaks of sheep scab show a steady decline with 16 outbreaks against 20 in the previous year. The incidence of swine fever is greatly reduced, there being 82 confirmed outbreaks, compared with 260 for the previous twelve months.

With the exception of tuberculosis, none of the other scheduled diseases occurred in the county.

The Tuberculosis Order, 1925

The administration of this Order is one of the principal functions of the staff. During the year, 1,188 cattle were slaughtered under its provisions; of these animals, 480 suffered from tuberculosis of the udder, 157 from tuberculous emaciation and the remainder from chronic cough and definite clinical symptoms of tuberculosis. The total compensation paid was £6,037 7s. 6d.; the salvage obtained 1,797 9s. 10d. The average valuation per head was £10 17s. 3d.; the average compensation £5 1s. 7d. It is most interesting and significant to note that 40·4 per cent. of the animals slaughtered suffered from tuberculosis of the udder, and one cannot estimate the enormous benefit conferred on the public by the elimination of these cows.

Owners of cows taken under the Order are encouraged to attend *post-mortem* examinations, but few farmers take advantage of this invitation, as their confidence in the veterinary staff is firmly established.

The first section of the report concludes with details of laboratory examinations carried out by the staff. In all, 2,417 specimens were examined microscopically, 712 being found to contain tubercle bacilli.

Milk and Dairies Acts and Orders

The second and final section of the report deals with the work done under the above heading.

One sees that there is an increase in the number of complaints received under Section 4 of the Milk and Dairies (Consolidation) Act, 1915, these having risen to 61 from 42 in the previous year. This increase is undoubtedly due to the greater activity of public health authorities in examining bulk samples of milk. Investigation of these complaints resulted in the detection of 48 tuberculous cows and satisfactory reasons are given for failure to detect the remaining 13, most of which had apparently been disposed of by their respective owners.

During the year, the Medical Officer's staff took approximately 1,295 bulk samples of milk, and of these only 29 were found to contain tubercle bacilli, a percentage of only 2·24. Such a result is highly satisfactory and strongly suggests that the regular routine veterinary examination of the cattle is being performed in a most thorough and capable fashion. Interesting accounts are given in this section of school milk supply and also of investigations of the milk supply to humans suffering from tuberculosis of suspected bovine origin.

Milk and Dairies Order, 1926

In the West Riding the members of the veterinary staff regularly inspect cattle on 8,600 farms situated in 147 different sanitary areas. In eleven of these areas inspections are carried out quarterly; in the remainder an attempt is made at a bi-annual inspection. Major Rabagliati advocates more frequent examinations, which would, of course, necessitate amplification of the present staff.

The co-operation of local medical officers has been secured and maintained, the veterinary officers being accompanied during practically all routine inspections by either the local M.O.H. or sanitary inspector. That these inspections have

borne fruit is very apparent; the dirty cows and cowsheds of a few years ago are now a rarity and the old-standing type of tuberculous udder practically unknown.

Visits numbering 17,076 were paid to farms and 187,831 cattle examined, 703 of which were found to be suffering from forms of tuberculosis defined in the Tuberculosis Order, 1925.

In addition to their usual work, the members of the veterinary staff have carried out certain miscellaneous duties.

The herds at county institutions have been twice submitted to the tuberculin test, advice has been given in meat inspection, and the 31 Grade "A" herds have been inspected quarterly.

The report concludes with a tabular list of farms registered under the Milk and Dairies Order, under their respective sanitary districts, showing the number of cows, the number of inspections carried out, and the number of tuberculous animals dealt with. A summary of cases dealt with under the Tuberculosis Order is also given.

It only remains for one very heartily to congratulate Major Rabagliati and his staff on the excellence of their work during the year, and it is devoutly hoped that the day is near when local authorities throughout the land will seek to emulate that high standard which is maintained by the West Riding Veterinary Department.

A. B. K.

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CIVIL VETERINARY DEPARTMENT, BENGAL, AND BENGAL VETERINARY COLLEGE

ANNUAL REPORTS FOR THE YEAR 1931-32

This report (Bengal Secretariat Book Depôt, Calcutta. Price 6d.) recounts the activities of the various branches of the Bengal Civil Veterinary Department for the year 1931-32 and it is a very creditable record of work. Progress is hampered by shortage of funds and it would appear to be a matter of grave concern that inspection work has had to be seriously limited for that reason. Experimental and research work is particularly handicapped by this short-sighted policy.

Disease.—There was an increase in the mortality of animals from contagious diseases as compared with that of the preceding year. Rinderpest was responsible for 71 per cent. of the deaths reported from bovine disease and hæmorrhagic septicæmia for about 20 per cent. Preventive inoculation was carried out extensively and it is pleasing to record that in one district part of the cost was borne privately. Encouraging results have been obtained by the use of "goat virus alone" for inoculation against rinderpest. If this method is proved to be capable of general adoption, the immunity of cattle against rinderpest could be secured at much less cost than at present. It is admitted that veterinary aid in the districts is still inadequate, but steps are being taken towards the construction and improvement of hospitals and dispensaries.

A scheme for the appointment of a Veterinary Investigation Officer has been sanctioned, but is still in abeyance.

General.—A number of stud bulls is kept by Government and local bodies but it is far below requirements, and more Livestock Officers are required. Experiments have been initiated with a hormone treatment for slowness of breeding in cattle. It is suggested that the solution of this problem in India lies in more attention to dietetics.

In addition to the Director and Veterinary Adviser, Mr. P. J. Kerr, the district staff consisted of two Assistant Directors, eight Inspectors and 125 Veterinary Assistant Surgeons. Seven additional posts have been sanctioned for the district of Daeca.

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Bengal Veterinary College.—The College maintained its popularity and there was an increase in the number of applications for admission from various parts of India and even outside. At the close of the session there were 169 students, of whom 56 came from Bengal. All were in residence in the College Hostels, which appear to be very well managed. Certain improvements have been made but further schemes in this direction are held up, including the improvement of the Dissection Theatre. The examiners report that further assistance is required in teaching.

The work conducted in the Raymond Research Laboratory of the College continues very actively and fodder cultivation at the College receives marked attention.

The work of the Department of Epizoötic Diseases in Calcutta, which is controlled by the Principal of the College, provides an interesting section of the report.

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The Government of Bengal records its appreciation of the work of Mr. Kerr, the Director, and Khan Salub Saiyed Sultan Ahmed, who officiated for part of the year, and also of Mr. MacGregor, the Principal of the College.

The Minister in charge notes with pleasure the names of those members of the Departmental and College staff who are mentioned in the report for good work during the year.

G. K. W.

A legal standard for sausages is advocated by Dr. T. M. Strang, Medical Officer of Health for Clydebank, in his annual report on food supplies. This is one article, he says, which should have a legal standard, as it forms a large proportion of the diet of working-class people.

XIIM

Review

[**Horses from Dealer to Covert.** By "Spider" Jacobson. Constable and Co., Ltd. Price 7s. 6d.]

At the present time there are many books dealing with the horse and its management, but in "Horses from Dealer to Covert" the author differs from many in that he imparts invaluable information at first hand.

In a very lucid and gripping manner the writer relates his experiences as a horseman, both as a rider to hounds and as an "owner-groom." In fact, Captain Jacobson tells us the hunter's life story—how to buy the animal, how to avoid the pitfalls in "making a deal," how to break, school, feed and groom it, and doctor its minor ailments, and finally turn it out as a first-class hunter.

This is a book which all horse owners should read and pass on to their grooms. It will prove useful to the veterinary student and it contains much of interest to the veterinary surgeon. "Take no notice of a big knee or a few lumps and bumps," says the author, "I like them. I am very chary of an aged horse with lovely clean legs and no lumps and bumps about him; it always seems to me like one of those things that are too good to be true."

As Captain Jacobson proceeds chapter by chapter so he "warms to his work," and the book becomes more and more interesting.

In the last chapter he describes a rollicking run with hounds in a gripping style, which could not have been bettered by Jorrocks.

A list of "Don'ts" at the end should be memorised by every youngster who intends to obtain the most from following hounds.

The illustrations are not elaborate, but instructive and sufficient.

COD-LIVER OIL AND VITAMIN A CONCENTRATION

The *Pharmaceutical Journal* quotes N. L. MacPherson (*Nature*, 1933, 132, 26) as stating that the vitamin A content of cod-liver oils, based upon Lovibond blue units, has been related to the age of the cod, and the following table shows the trend of the results:—

Vitamin A Value: Lovibond Blue Units (10 per cent. dilution)	Length of Cod in cm.	Approx. Age of Cod in Years
2·5	42	4
2·5	52	5
21·0	105	12
24·5	117	13

The fact that oils from the west coast of Newfoundland are more potent than those from the east coast is attributed to the greater age of the fish.

N.V.M.A. Divisional Report

DERBYSHIRE V.M.A.*

MEETING AT DERBY

A meeting of this Division was held at the Agricultural Institute, St. Mary's Gate, Derby, on Thursday, April 25th, 1933, when there were present: Mr. H. S. Cockburn (President) in the chair, Messrs. Auchterlonie, Eaton, Gunning, Morris, Sheffield, Torrance, Wilkinson, and Ironside. Mr. G. B. Brook, and Mr. H. E. Powell were present as visitors.

The minutes of the previous meeting were confirmed and signed.

Nomination of New Members.—Mr. G. B. Brook and Mr. H. E. Powell were nominated.

Election of New Member.—Mr. Norman Foster was elected a member of the Division.

Correspondence.—*Representative to Congress of R.S.I.*—The recommendations of the Council were adopted, and Captain H. L. Torrance was nominated as representative.

Divisional Representative, N.V.M.A.—The Council's recommendations were again adopted, and it was agreed to ask Captain Gunning to act in this capacity. Captain Gunning agreed to do this.

Subscription to National Horse Association.—It was agreed that the support given to this Association be continued, and that the subscription of £1 1s. be sent.

Report of Reorganisation Commission for Milk.—It was agreed that a special meeting be held on Thursday, May 18th, to give full consideration to this matter.

R.S.P.C.A.—An invitation was received from the local branch to attend a meeting at which Professor Sir Frederick Hobday was to give an address on "The Humane Slaughtering of Animals," and the following resolution was carried: "That this Association whole-heartedly supports Professor Sir Frederick Hobday and the R.S.P.C.A. in their endeavours to obtain universal humane slaughtering of animals."

Captain Gunning was appointed to attend the meeting and deliver the resolution to Sir Frederick.

Paper.—A paper (previously circulated to members) by Mr. George Eaton, F.R.C.V.S., of Hallaton, Market Harborough, and entitled "The Differential Diagnosis of Diseased Conditions and Abnormalities of the Mouth and Feet of Cattle, Sheep, and Swine, with Particular Reference to Foot-and-Mouth Disease," was now discussed.

[Mr. Eaton's paper is reproduced, together with a report of the discussion and editorial comment, earlier in this issue.—Ed., *V.R.*]

The meeting terminated with the passing of a hearty vote of thanks to the essayist for his most interesting and informative paper.

W. J. Ironside, *Hon. Secretary.*

*Received for publication, July 7th, 1933.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

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DIARY OF EVENTS

Sept. 2nd.—Meeting of the North of England Division, N.V.M.A., at Armstrong College, Newcastle-on-Tyne.

Sept. 4th.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, at 4.30 p.m.

Sept. 15th.—Meeting of the Southern Counties Division, N.V.M.A., at Bournemouth.

Sept. 18th-22nd.—N.V.M A. Congress, Llandudno.

Sept. 21st.—Meeting and Luncheon of the Royal (Dick) Veterinary College Alumnus Association, at the Royal Hotel, Llandudno.

Sept. 25th-26th.—R.C.V.S. Jubilee Memorial and Bursary Prize Examination.

Oct. 4th.—R.C.V.S. Committee Meetings.

Oct. 5th.—R.C.V.S. Registration Committee.

Oct. 6th.—R.C.V.S. Committee and Council Meetings.

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It is regretted that from the Programme of the Llandudno Congress printed on page 5 of the Handbook, the name of Mr. H. Llewelyn-Jones was inadvertently omitted as one of the openers of the discussion on Dr. Minett's paper: "Johne's Disease, including Johne's Disease in Sheep."

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PERSONAL

Wills.—Beeson, Mr. Stephen, of Hereford, retired veterinary surgeon (net personalty, £5,629), £9,355.

Booth, Mr. Frank, m.r.c.v.s., of Old Colwyn (net personalty, £4,222), £5,579.

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R.C.V.S. OBITUARY

Galloway, William, "Palmiste," Alexander Street, Dumbarton. Graduated Glasgow, December 22nd, 1892; died August 26th, 1933, aged 64 years.

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The Late Mr. K. D. Turner, m.r.c.v.s.: An Appreciation

The many friends in Malaya of Mr. Kenneth Douglas Turner, m.r.c.v.s., learned with regret of his death in London on June 20th, 1933, at the early age of 38, as recorded in your issue of July 1st.

Mr. Turner, after serving in the Eastern Expeditionary Force, entered the Royal Veterinary College, London, and qualified in 1923. He joined the Malayan Veterinary Service in 1926 and served for a few months in the State of Perak. Later in the same year he was transferred to Pahang and was instrumental in stamping out the last remnants of rinderpest that had raged in that State for more than a year. During the next three years he took an active part in carrying out the policies that rebuilt the herds and restored the livestock industry of Pahang. In 1930 he attended the International Veterinary Conference on behalf of Malaya. On his return, he served for a short period in Singapore and later in Selangor; but increasing ill-health forced him to leave the country in 1932 and to retire this year, shortly before his death.

A keen horseman, "Tarzan," as he was usually called, earned great popularity among the racing fraternity, while his invariable good humour and ready wit endeared him to all. The Malayan Veterinary Service have suffered a severe loss.

R. M.

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FOOT-AND-MOUTH DISEASE

Fewer Outbreaks in 1932

A considerable reduction of the number of outbreaks of foot-and-mouth disease during 1932 when compared with the previous year, is recorded in the annual report, issued by the Ministry of Agriculture, on the proceedings under the Diseases of Animals Act, and which we shall review in an early issue. The number last year was 25, which is the lowest recorded in any year since 1918, with the exception of 1930, when only eight outbreaks occurred. The animals slaughtered last year in connection with the outbreaks were 629 cattle, 1,608 sheep, 416 pigs, and one deer, while the compensation paid totalled £16,521 6s.

A small outbreak of foot-and-mouth disease among swine in Norfolk was notified by the Ministry of Agriculture on Sunday last.

The outbreak occurred among swine in a small piggery at Neatishead, ten miles north-east of Norwich. The area subject to the restrictions lies almost entirely in the county of Norfolk, but also includes four parishes in East Suffolk.

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WORLD'S POULTRY CONGRESS, 1933

The World's Poultry Congress at Rome, from September 6th to 15th, will be housed in the Market Place of Trajan in the old Imperial City, and the fourth floor of the ancient building has been allotted to foreign national exhibits, the British display being accommodated in three of its massive vaulted chambers.

The aim of the British National Exhibit, which has been designed by Captain G. W. Spencer, of the Ministry, the staging being planned by Captain J. S. Lee, a.r.i.b.a., Superintending Architect to the Ministry, is to emphasise the excellence of British poultry stock and the sound organisation of the poultry industry in this country. The central display will direct attention to the four most popular commercial utility breeds—Rhode Island Red, Light Sussex, White Leghorn and White Wyandotte. Carefully selected specimens of each breed have been stuffed and mounted on a turntable which, revolving round a large globe, symbolises the United Kingdom's export of poultry to all parts of the world. On a decorative panel in the background is a statement of national poultry activities, state-aided and voluntary. The other walls of this central chamber are devoted to statistical information on the growth and expansion of British poultry production.

The two other chambers are allocated, respectively, to Research and Education exhibits. In the Research section, an exhibit, prepared by Professor R. C. Punnett, will illustrate some of the latest activities of the Small Animal Breeding Research Institute at Cambridge. The importance of the Silver Cambar breed for sex-linkage, and the recently-discovered sex-linked cross between a dark Runner duck and a fawn Runner drake, are particular features of this exhibit. Another

Research exhibit illustrates experiments, under the direction of Mr. M. S. Pease, Geneticist at the Animal Nutrition Institute, Cambridge, in the development of the Cambar breed to produce a commercial strain of high fecundity.

The Poultry Nutrition exhibit has been prepared by Captain E. T. Halnan, of the Animal Nutrition Institute, Cambridge, the main feature illustrating the food requirements of hens laying, respectively, 50, 150 and 250 eggs per annum. Another feature shows the effect of food upon egg colour. The Pathological exhibit is concerned with the production and use of the new vaccine treatment for fowl-pox, and has been arranged by Mr. N. Dobson, of the Ministry's Veterinary Laboratory, Weybridge.

In the Education section, an exhibit, prepared by the National Poultry Institute, includes a general survey of the instructional and experimental work at the more important centres. There is also a model display of the lay-out of plant at the various institutes, and a statement of the duties of a county poultry instructor, set out on a decorative wall panel. Another exhibit deals with egg-laying trials and emphasises the value of the "copper ring" marking and of the register of records.

An exhibit, prepared by the National Rabbit Council, comprises specimens of Angora wool and of pelts of the various fur breeds of rabbits, together with a display of garments, etc., made from them.

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H.M. STATIONERY OFFICE PUBLICATIONS.

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses: London: Adastral House, Kingsway, W.C.2, and 28, Abingdon Street, S.W.1; Cardiff: 1, St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120, George Street.

	Price Net. s.	d.	*Post Free.* s.	d.
Statutory Rules and Orders, 1933:—				
800. Dangerous Drugs. Order in Council, dated August 8th, 1933, as to the application of Part III of the Dangerous Drugs Act, 1920	0	1	0	1½
806. Pharmacy and Poisons. The Pharmacy and Poisons Act, 1933 (Date of Commencement) Order (No. 1), dated August 8th, 1933 ...	0	1	0	1½
Agriculture and Fisheries, Ministry of:—				
Diseases of Animals Acts:— Report of Proceedings for the year 1932. (24-27-0-32) ...	1	3	1	5

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DOG ON APPROVAL: LIABILITY FOR LICENCE

A curious position arose in Leeds Police Court recently concerning the ownership of a dog which was the subject of two summonses. Charles Sharpley, licensee, of Kirkgate, Leeds, was charged with failing to keep the dog under proper control and with keeping it without a licence.

His defence was that he was not the actual owner, and was therefore not responsible. He had the dog on approval for a fortnight, but it would not stay with him and had since run away.

The Stipendiary Magistrate (Mr. Horace Marshall): How am I to make an order that a dog be kept under control when the person in whose control it has been no longer has it and does not want it?

The Magistrate later said that, in his opinion, for the purpose of the Act, the "owner" of a dog was not necessarily the person who had bought it, but the person in whose care it was. In the circumstances the summonses would be dismissed under the Probation of Offenders Act.

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MEAT INSPECTION IN CANTON

The March issue of *Inspection and Commerce* (Shanghai) contains an interesting description of the construction and operation of three slaughterhouses in Canton, China, at a cost of $310,000, furnishing an area of about 112,913 square feet.

Animals slaughtered are hogs, sheep, goats, carabao and cattle. Working time is from 10 a.m. to 1 p.m. and from midnight to 3 a.m. Slaughter is under the supervision of the municipal bureau of health. "It appoints veterinarians and officers of the slaughterhouses. There is an inspector-in-chief, C. Y. Lee, D.V.M. (Iowa State College, U.S.A.). In each abattoir there is a veterinary inspector, who is in charge of the *ante-mortem* and *post-mortem* inspection. There are assistant veterinarians, who help to perform routine duties and assist in *ante-mortem* and *post-mortem* inspection."

Post-mortem inspection comprises the following: "(1) Inspection of all parts and organs; (2) feeling of certain parts, such as lungs, spleen, udder, tongue, etc.; (3) incision of lymph glands; (4) squeezing out the contents of passages and cavities of certain organs; (5) reaction test of muscles; (6) microscopical examination if necessary; (7) bacteriological examination if necessary; (8) chemical examination if necessary.

"For simplicity, slaughtered animals may be judged by the veterinary inspector as 'passed' or 'condemned.' By 'passed' is meant that the carcass, part of the carcass, meat, and meat food products are healthy, sound and fit for human consumption. It is then immediately stamped. By 'condemned' is meant that the carcass, including all its parts, is not fit for human consumption. It is detained in the abattoir and locked up in the retaining room for proper disposal."—*N. Am. Vet.*

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

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VETERINARY ADVISORY SCHEME

To the Editor of the Veterinary Record

Sir,—It is quite possible that many practitioners in areas where no veterinary adviser exists are not well acquainted with the scheme and do not actually realise what it means. According to his instructions from the Ministry of Agriculture, a veterinary adviser has the right to enter any farm or premises of any one of our clients without our knowledge, where requested to do so by the proprietor or occupant.* Now I maintain that that power, thus given to him, is fundamentally wrong: that it is a breach of etiquette which constitutes "unprofessional conduct" according to the Veterinary Surgeons Act of 1881. The fact that that power is given by the Ministry

of Agriculture is quite immaterial. It simply shows that whoever sanctioned it did so without due consideration for the Act referred to and the rights of a small profession. It appears—from this lack of consideration, or lack of experience in drafting such instructions—that whoever was responsible was "spoon fed" by someone who had "an axe to grind."

No man who sits down and thinks the matter over seriously can possibly come to any other conclusion than that the thing is wrong and that therefore he must object to it on principle, even if he has not had any actual experience of it. If we, as practitioners, do not raise a very strong protest *now*, the system will be planted in every area throughout England and Wales, to our material detriment and loss of prestige. It is time we united together and said, as did the brave French soldiers when they defended Verdun, "Ils ne passeront pas."

I would like it clearly understood that there is nothing personal in my protest. I count the veterinary adviser in North Wales a personal friend and I can venture to say that among my colleagues he is personally very popular. It is not his fault that such powers have been conferred upon him. Nevertheless, I think I am voicing the opinon of the majority of us, at any rate, when I say that we strongly object to this right which he holds to enter any farm as the result of a direct request from the farmer. The fact that each county contributes annually towards the scheme makes no difference at all to the principle of the thing, though the farmer may think that, because he is a ratepayer, he has a right to "something for nothing," so to speak.

To my mind, the whole system is wrong. It requires reorganising and placing on a different basis altogether.

Yours truly,

H. Llewelyn-Jones, M.R.C.V.S.

Denbigh,
North Wales.
August 21st, 1933.

[* In this connection, we append instructions (Nos. 2 and 6) to veterinary advisers issued by the Ministry of Agriculture and Fisheries in August, 1931, following representations made to the Ministry by the N.V.M.A.:—

"(2) A veterinary adviser should not treat individual cases of disease except where extreme urgency demands such action. In such a case first-aid treatment should be given and the owner should be advised to send for his veterinary practitioner. In certain provinces it is not possible to apply this rule without exception to poultry diseases, but even so the adviser should not treat cases if a veterinary practitioner is normally employed or is likely to be called in."

"(6) In general, the cases in which advice should be given should be restricted to the following three classes:—

(*a*) Epizoötics.

(*b*) Outbreaks of obscure cases of disease.

(*c*) Prevention of disease.

On every occasion *before* investigating a case, the veterinary adviser should inform, and, if possible, obtain the collaboration of, any veterinary practitioner or practitioners who may be employed on the farm or farms concerned."

These revised instructions were reproduced in full in our issue of October 24th, 1931, page 1077. —Ed., *V.R.*]

The Editor acknowledges, with thanks, the receipt of the following:—

Reports of meetings of the Lancashire and of the Royal Counties Divisions, N.V.M.A., from Mr. A. L. Mullen and Mr. H. Bell, respective Hon. Secretaries.

Communications from Mr. D. Cabot (London), Captain W. L. Little (Reading), Mr. R. Macgregor (Pahang) and Captain S. Villar (Amersham Common).

Diseases of Animals Acts, 1894 to 1927

SUMMARY OF RETURNS

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic§ Mange.		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks reported by the Local Authorities.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 1st to 15th August, 1933	11	14	2	9	—	—	12	32	28
Corresponding period in									
1932	9	11	3	204	7	7	10	39	31
1931	6	10	5	241	2	2	4	33	5
1930	10	10	—	—	4	10	14	74	36
Total 1st January to 15th August, 1933	184	208	58	5,359	102	178	224	970	589
Corresponding period in									
1932	246	303	6	562	96	156	146	1,180	585
1931	319	355	79	8,478	104	171	195	1,249	511
1930	249	272	—	—	165	251	272	1,634	674

Note.—The figures for the current year are approximate only.

§ Excluding outbreaks in Army Horses.

N.V.M.A. Congress at Llandudno, September 18th-22nd, 1933

PROVISIONAL COMMITTEE.

CHAIRMAN.—LIEUT.-COLONEL P. J. SIMPSON, D.S.O., T.D., J.P., F.R.C.V.S. (President, N.V.M.A.)

Professor James Macqueen, F.R.C.V.S., Past-President, N.V.M.A.
Professor J. F. Craig, M.A., M.R.C.V.S., Vice-President, N.V.M.A.
Major J. G. McGregor, T.D., M.R.C.V.S., Vice-President, N.V.M.A.
G. H. Locke, Esq., M.R.C.V.S., Vice-President, N.V.M.A.
Major-General Sir John Moore, K.C.M.G., C.B., F.R.C.V.S., Vice-President, N.V.M.A.
J. W. McIntosh, Esq., M.R.C.V.S., F.R.S.E., Hon. Secretary, N.V.M.A.
Captain W. G. Wragg, M.R.C.V.S., Hon. Treasurer, N.V.M.A.

Co-opted Members

Captain J. Cane, M.R.C.V.S. (Representing the North Wales Division, N.V.M.A.).
F. G. Edwards, Esq., F.R.C.V.S., (Representing the Lancashire Division, N.V.M.A.)
H. Llewelyn-Jones, Esq., M.R.C.V.S., (Representing the North Wales Division, N.V.M.A.)
Captain R. L. Lewis, M.R.C.V.S., D.V.H. (Representing the North Wales Division, N.V.M.A.)
Captain A. W. Noel Pillers, F.R.C.V.S., D.V.S.M. (Representing the Lancashire Division, N.V.M.A.).
Professor J. T. Share-Jones, D.V.Sc., M.Sc., F.R.C.V.S., (Representing the North Wales Division, N.V.M.A.).
T. Wilson, Esq., M.R.C.V.S., (Representing the Lancashire Division, N.V.M.A.)
William Woods, Esq., F.R.C.V.S. (Representing the Lancashire Division, N.V.M.A.)

Local Honorary Secretary.—L. W. WYNN LLOYD, Esq., J.P., F.R.C.V.S., "Langdale," Deganwy, North Wales.

All enquiries to be addressed: General Secretary, N.V.M.A., 2, Verulam Buildings, Gray's Inn, London, W.C.1.

PROGRAMME

The following is the Programme of the Association's Congress, to be held at Llandudno from September 18th to September 22nd:—

Monday, 18th, *9.30 a.m.*—Opening of Exhibition of Surgical Instruments, Drugs, etc., by the President. (Town Hall.)

Monday, 18th, *10 a.m.*—Opening of the Congress by the Chairman of the Urban District Council of Llandudno. (Town Hall.)

Monday, 18th, *11 a.m.*—Combined Meeting of Public Health, Experimental Pathology, and Veterinary Medicine and Surgery Sections, to discuss further the subject of "Vaccination against Bovine Contagious Abortion and the relation of this Disease to Undulant Fever of Man." (Town Hall.)

Monday, 18th, *2.30 p.m.*—N.V.M.A. Colonial Veterinary Officers' Sub-Committee. (Town Hall.)

Monday, 18th, *9 p.m.*—Reception by President, Grand Hotel.

Tuesday, 19th, *9.45 a.m.*—Paper: "The Significance of (*a*) Acid-fast Bacilli, (*b*) *Bacillus coli*, in Milk." (Town Hall.)

Tuesday, 19th, *11.30 a.m.*—Paper: "Johne's Disease, including Johne's Disease in Sheep." (Town Hall.)

Tuesday, 19th, *2.30 p.m.*—Meeting of the British National Committee of the International Veterinary Congress. (Town Hall.)

Wednesday, 20th, *9.45 a.m.*—Paper: "Meat Preservation." (Town Hall.)

Wednesday, 20th, *11.30 a.m.*—Paper: "Helminths of Economic Importance in Farm Animals, excluding Poultry." (Town Hall.)

Wednesday, 20th, *10 a.m.*—Excursion for Ladies. (Depart, Town Hall, 10 a.m.; return 4 p.m.)

Wednesday, 20th, *2.30 p.m.*—Council Meeting. (Town Hall.)

Wednesday, 20th, *3.30 p.m.*—Annual General Meeting (Town Hall), to be followed by Extraordinary General Meeting.

Wednesday, 20th, *7.30 p.m.*—Annual Banquet, followed by Dance, Grand Hotel.

Thursday, 21st, *9.45 a.m.*—Paper: "Diseases and Accidents referable to the Hunting Field and to the Turf." (Town Hall.)

PROVISIONAL PROGRAMME—continued.

THURSDAY, 21ST, *10 a.m.*—Ladies' Golf Competition, Llandudno Golf Club (Maesdu).
THURSDAY, 21ST, *11.30 a.m.*—Paper: "Fractures and Dislocations in Small Animals." (Town Hall.)
THURSDAY, 21ST, *12.30 p.m.*—Congress Photograph.
THURSDAY, 21ST, *2 p.m.*—V.V.B.F. (Simpson) Golf Trophy Final, Llandudno Golf Club (Maesdu).
THURSDAY, 21ST, *2.30 p.m.*—Demonstration on Meat Inspection of Animals, *ante-* and *post-mortem*—Harold Burrow, M.R.C.V.S., D.V.S.M. (Public Abattoir, Llandudno.)
THURSDAY, 21ST, *9 p.m.*—Dance in aid of Veterinary Benevolent Funds, Grand Hotel (till 1 a.m.)
FRIDAY, 22ND, *9.45 a.m.*—Paper: "The Relationship of Poultry Diseases to the Practitioner." (Town Hall.)
FRIDAY, 22ND, *11.30 a.m.*—Paper: "Swine Fever and Enteritis in Young Pigs." (Town Hall.)
FRIDAY, 22ND, *2.15 p.m.*—Council Meeting. (Town Hall.)
FRIDAY, 22ND, *3 p.m.*—Closing Meeting. (Town Hall.)

SUBJECTS FOR PAPERS

PUBLIC HEALTH SECTION

(*President*: *Lieut.-Colonel J. W. Brittlebank*, C.M.G., M.R.C.V.S., D.V.S.M. (VICT.).
(*Vice-President*: *Major D. S. Rabagliati*, O.B.E., B.SC., F.R.C.V.S., D.V.S.M.)
(*Recording Secretary*: *P. F. Dolan, Esq.*, M.R.C.V.S., D.V.S.M.)

1.—"The Significance of (*a*) Acid-fast Bacilli, (*b*) *Bacillus coli*, in Milk."
By G. O. Davies, M.V.SC., M.R.C.V.S., D.V.H., Liverpool.
Opener: Captain H. L. Torrance, M.R.C.V.S., D.V.S.M., Nottingham.

2.—"Meat Preservation."
By Dr. W. R. Wooldridge, M.SC., M.R.C.V.S., London.
Opener: T. Moran, D.SC., PH.D., Low Temperature Research Station, Cambridge,

VETERINARY MEDICINE AND SURGERY SECTION

(*President*: *Captain R. L. Lewis*, M.R.C.V.S., D.V.H.)
(*Vice-President*: *Captain J. Cane*, M.R.C.V.S.)
(*Recording Secretary*: *Captain O. V. Gunning*, D.V.M., M.R.C.V.S.)

1.—"Helminths of Economic Importance in Farm Animals, excluding Poultry."
By Captain A. W. Noel Pillers, F.R.C.V.S., D.V.S.M., Liverpool.
Opener: Captain N. Bisset, M.R.C.V.S., Cardiff.

2.—"Diseases and Accidents referable to the Hunting Field and to the Turf."
By Major A. A. Comerford, M.R.C.V.S., Potton.
Opener: Captain E. Brayley Reynolds, O.B.E., M.R.C.V.S., Newmarket.

3.—"Fractures and Dislocations in Small Animals."
By Professor J. McCunn, M.R.C.V.S., M.R.C.S., L.R.C.P., London.
Opener: C. Wentworth Elam, M.R.C.V.S., D.V.H., Liverpool.

4.—"The Relationship of Poultry Diseases to the Practitioner."
By Norman Dobson, B.SC., M.R.C.V.S., Weybridge.
Opener: G. C. Marginson, M.R.C.V.S., D.V.S.M. (VICT.), Whitestake.

EXPERIMENTAL PATHOLOGY SECTION

(*President*: *Professor J. F. Craig*, M.A., M.R.C.V.S.)
(*Vice-President*: *A. L. Mullen, Esq.*, M.R.C.V.S., D.V.S.M. (VICT.).)
(*Recording Secretary*: (To be appointed.)

1.—"Johne's Disease, including Johne's Disease in Sheep."
By Dr. F. C. Minett, M.B.E., M.R.C.V.S., London.
Openers: Major G. W. Dunkin, M.R.C.V.S., D.V.H., Mill Hill; H. Llewelyn-Jones, M.R.C.V.S., Denbigh.

2.—"Swine Fever and Enteritis in Young Pigs." By J. O. Powley, M.R.C.V.S., Harrogate.
Opener: F. Beckett, M.R.C.V.S., Blandford.

COMBINED SECTIONS

(*President*: *Professor J. Basil Buxton*, M.A., F.R.C.V.S., D.V.H.)
(*Vice-President*: *Major R. Isherwood*, M.R.C.V.S.)
(*Recording Secretary*: *Harold Burrow, Esq.*, M.R.C.V.S., D.V.S.M.)

"Vaccination against Bovine Contagious Abortion and the relation of this Disease to Undulant Fever of Man."
By Dr. W. H. Andrews, M.R.C.V.S., Weybridge.
Openers: Captain S. J. Motton, F.R.C.V.S., Penzance. (From the Practitioner's point of view.)
Captain J. McAllan, M.A., B.SC., M.R.C.V.S., Belfast, and Sir Weldon Dalrymple-Champneys, Bart., M.D., M.R.C.P., Ministry of Health. (From the Public Health point of view.)
Ll. E. W. Bevan, M.R.C.V.S., London. (From the Experimental Pathology aspect.)

LIST OF HOTELS AND BOARDING HOUSES

Hotels

Grand Hotel, *Promenade* (licensed), from 21s. per day.

Imperial Hotel, *Promenade*, from 18s. per day.

St. George's Hotel, *Promenade* (licensed), from 16s. 6d.* per day.
(* Subject to a special discount of 10 per cent.)

Marine Hotel, *Promenade* (licensed), from 16s. 6d. per day.

Queen's Hotel, *Promenade* (licensed), from 16s. 6d. per day.

The Hydro, *Neville Crescent, Promenade* (licensed), from 18s. per day.

Royal Hotel, *Church Walks, Promenade* (licensed), from 15s. per day.

Craigside Hotel, *Little Orme, Promenade* (licensed), from 15s. per day. (Free 'bus service to and from town.)

Clarence Hotel, *Gloddaeth Street* (licensed), from 15s. per day.

North Western Hotel, *Vaughan Street* (licensed), from 16s. 6d. per day.

Private Hotels (PH) and Boarding Houses (B)

GRAND PROMENADE:

North Parade—

The Links, from 12s. 6d. to 15s. 6d. per day.
Moseley, 10s. 6d. per day.
Claremont (B), from 10s. 6d. per day.
Knowsley (PH), from 11s. per day.
Belle Vue (PH), 10s. 6d. to 12s. 6d. per day.
Waverley (PH), from £3 3s. per week.
Parade House, from 10s. 6d. per day.
Kensington (B), from 9s. 6d. per day.
Latimer (PH), from 10s. 6d. to 12s. 6d. per day.
The Manor (B), 7s. 6d., to 9s. 6d. per day.
Rothesay (PH), 11s. 6d. to 14s. 6d. per day.
Min-y-don (B), from 10s. 6d. to 12s. 6d. per day.
Osborne (PH), from 13s. 6d. per day.

South Parade—

Anthony (PH), from 10s. 6d. per day.
Almora (PH), from 11s. 6d. per day.
Clovelly (PH), from 10s. per day.
Merrion, 9s. to 10s. 6d. per day.
Wyecliffe (PH), 10s. 6d. to 12s. 6d. per day.

Glanymor Terrace—

Brinkburn (PH), from 10s. 6d. per day.
Egryn (PH), 10s. 6d. to 12s. 6d. per day.

St. George's Crescent—

Elsinore (PH), from 11s. 6d. per day.
Trevone (B), from 7s. 6d. to 10s. per day.
White House (PH), from 10s. 6d. per day.
Regent, 9s. per day.
Somerset (PH), from 10s. 6d. per day.

Gloddaeth Crescent—

Chatsworth House (B), 9s. to 13s. 6d. per day
Toronto (PH), 10s. 6d. to 12s. 6d. per day.
St. Kilda (B), 12s. per day.
Ingleboro (PH), 10s. 6d. and 11s. 6d. per day.

Deganwy Avenue—

Glencoign, 9s. to 10s. 6d. per day.

Neville Crescent—

Aberford (B), 10s. 6d. per day.
Heath House (PH), from 7s. 6d. per day.
Seaforth (PH), from 10s. 6d. per day.
Crescent (PH), from 10s. 6d. per day.

Penrhyn Crescent—

Four Oaks (Temperance), from 12s. per day.
Sefton Gate (PH), from 10s. 6d. per day.
East Lynne (B), from 9s. per day.
Claremont, from 10s. per day.

Craig-y-don Parade—

The Craig-y-don, from 12s. 6d. per day.
Ormescliffe, 13s. 6d. to 17s. 6d.

Trinity Square—

"San Remo," 9s. to 12s. 6d.
"Abbeydale," 9s. to 12s.

Abbey Road—

"Whitefriars," 8s. 6d. to 9s. 6d.

Chapel Street—

Glascoed, from 9s. 6d. per day.

Rhos-on-Sea
(4 miles)

Rhos Abbey Hotel, from 16s. 6d. per day.

Colwyn Bay
(4 miles)

Colwyn Bay Hotel, from 23s. 6d. per day.
Imperial, from 13s. 6d. per day.

Rhyl

Pier, from 12s. 6d. per day.

Conway
(4 miles)

Castle Hotel, from £5 5s. per week. (*En Pension* terms.)